CALIFORNIA JOURNAL OF SECONDARY EDUCATION

170 SOUTH VAN NESS AVENUE, SAN FRANCISCO, CALIFORNIA

Vol. 19, No. 5 October, 1944

IN THIS ISSUE

A PROGRESS REPORT ON THE TEACHING OF AERONAUTICS IN CALIFORNIA SECONDARY SCHOOLS

A symposium evaluating the present progress of aviation teaching in the secondary schools of California and analyzing future problems which will have to be faced. Included are articles discussing the teaching of aeronautics in the junior high school, the high school, the junior college, and the adult school, accompanied by an analysis of what is to be the nature of the university's contribution. One article summarizes research studies in the field, and another outlines a program for improving teaching in aeronautics.

SECONDARY CURRICULUM STUDY IN MICHIGAN

This month's out-of-state article is written by Dr. T. D. Rice, director of the Michigan Secondary School Curriculum Study.

WHAT'S HAPPENING IN CALIFORNIA SCHOOLS

The news column conducted by the chief of the Division of Secondary Education is resumed in the current issue.

COÖPERATION IN THE NURSERY CENTER

Miss Mildred F. Eby of the Abraham Lincoln High School, Los Angeles, tells how homemaking students in her school are gaining practical experience in child care through work in the nursery center.

IN NOVEMBER

THE TEACHING OF UNITED STATES HISTORY

CALIFORNIA SOCIETY OF SECONDARY EDUCATION

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CALIFORNIA JOURNAL
OF SECONDARY EDUCATION

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TEACHING HISTORY IN THE SECONDARY SCHOOL

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THE POSTWAR PLANNING OF A CALIFORNIA SCHOOL SYSTEM

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A COURSE IN NINTH GRADE ORIENTATION

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A JUNIOR HIGH SCHOOL HEALTH PROGRAM

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Two Corrections

THE May, 1944, issue of the JOURNAL included lists of corporate and institutional members of the California Society of Secondary Education and of institutions having group subscriptions for the JOURNAL. Two errors appeared in these lists, correction of which is now made as follows:

The Central Junior High School, listed on page 218 as having a group subscription, is the Central Junior High School of Riverside. The list of Institutional Members should have included on page 269 the name of the Central High School, El Centro.

Since the May issue was published, a great many new memberships have been received by the Society. A complete, up-to-date list will be printed in a later issue.

Eurich Returns to Stanford

DR. ALVIN C. EURICH has been appointed as academic vice-president of Stanford University. He began his new duties late in May on his return from the United States Navy, in which he had served as a commander.

In the Navy, Dr. Eurich supervised the preparation of curricula for the Navy's schools and training courses and its personnel classification procedures and tests. He was stationed in the Training Division of the Bureau of Naval Personnel, Washington, D. C.

Dr. Eurich has been a member of the California Society of Secondary Education since going to Stanford in 1938 and at present is serving on the Society's Board of Trustees.

THE AIRPLANE POWER PLANT

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OF SECONDARY EDUCATION

Vol. 19 OCTOBER, 1944 No. 5

A Comment on the Postwar Planning Symposium

SO interesting are the comments which it makes with regard to the April, 1944, symposium in the JOURNAL that the following letter to the editor is quoted in its entirety.

"September 30, 1944

"Editor, CALIFORNIA JOURNAL OF SECONDARY EDUCATION
Haviland Hall, Berkeley, California

"Dear Editor:

"The symposium on 'The Secondary Schools and Postwar Planning' in the April issue of the JOURNAL has just come to my attention. The material was very interesting and stimulating.

"I was particularly struck by two statements. Mr. Gould of Los Angeles reminded us that 'public education for all of the United States is less than two and one-half billion dollars a year. In terms of today's expenditures for public purposes, this is almost in the category of chicken feed.' Dr. Saxon pointed out that annual costs for students at the upper levels of secondary and higher education range from $90 to perhaps $200 or $300, but that in schools maintained by the armed forces as much as $30,000 has been spent in training a single student within a period of less than twelve months.

"In every field of endeavor sights are being set far higher than ever before. A readjustment in perspectives is just as vital in the field of education as in any other field. Perhaps more so.

"A greatly extended program of expansion of educational services is not only of great importance in itself, but it must be considered as part of our nation's effort to maintain a well-functioning postwar economy and to avoid a depression that well could mean something akin to economic chaos.

"Today, the more far-sighted elements in government, labor, and management groups realize that the securing of the largest possible domestic market on the basis of a program of full employment and expansion of public services is vital to economic stability. There is no field in greater need of expansion than the field of educational services.

"One of the best defined programs for such expansion on a national scale seems to come from the National Resources Planning Board. In its Report for 1943, there is an article called 'Equal Access to Education,' in which is presented a fifteen-point program for accomplishing its aims.

"This program calls for nursery schools to be made generally available, for adequate educational opportunities for demobilized service men and women, for an extensive program of building construction and repair, for camp facilities to be made available to all youth above the lower elementary grades, for meals at school to be given all children who need them, for an expansion of the services of the U. S. Office of Education and state departments of education to provide adequate research facilities and educational leadership to the nation.

"The program calls for equal access to educational opportunities for all children and youth. This involves the raising of educational levels of the South in general and of the Negro in particular. It raises the question of expanding transportation and other services in rural areas. Since it calls for equal access to education for youth of college and university age, there is involved the question of providing young people with opportunities for getting a college education even though their parents cannot finance their higher education.

"The matter of higher wage levels for teachers is not raised; but if the most capable teachers are to be attracted to the profession something must be done in this direction.

"Dr. Saxon, in his article on 'Postwar Problems of Education,' points out that there is not a possible chance that individual communities will be able to provide enough money to bring their schools to the point where they will be acceptable to returning service men and women. Naturally, it would be still more unthinkable that individual communities would be able to realize the main features outlined in the Report of the Planning Board.

"The only possible solution to this question would be the appropriation of funds by the Federal and state governments. It would seem, then, that our first task is to educate public sentiment to a point where the appropriations can and will be made.

"It is obvious that appropriations on such a scale could not be considered without the active support of all the most important and influential groups in the nation. Thus, there arises the whole question of coöperation between professional educators and other groups working toward postwar prosperity—particularly organizations representing business, labor, and government groups.

The letter from Miss Naomi Willett quoted in these pages deals with a recent symposium which appeared in the "Journal." Entitled "The Secondary Schools and Postwar Planning," it was published in the April issue.

The symposium, which has been widely read throughout the country, included articles on such topics as Postwar Problems of Education, Postwar Secondary Schools in California, Broadening the Curriculum for World Unity, Local vs. Federal Control of Education, Providing School Facilities for the Postwar Period, Postwar Planning for the Junior College, Our Part in Reëducating the World.

Copies of this issue are still available at 50 cents each or at 35 cents each when ordered in lots of ten or more.

"Labor, Management, and Government are showing increasing signs of working together harmoniously to this end. We have only to mention such things as the Baruch Report as a product of a government agency, the program of the Committee of Economic Development in Southern California (section of a national business organization devoted to postwar planning), and the CIO Conference on Full Employment held in New York City in January to illustrate what can be done.

"It was very gratifying to read of further examples of coöperation between industrial and educational leaders as outlined by Roy Cloud in his April Journal article entitled 'Education and Industry join in Conferences.' It should be an easy matter for educational leaders to coöperate with chambers of commerce in their communities since the U. S. Chamber of Commerce Committee on Education has instructed all its local bodies to secure 'closer alliance between Education and Business.' (See

'Toward a Magnificent America,' by Thomas C. Boushall, *The Journal of the National Education Association*, 33:91-92, April, 1944.) Today it might be reasonably expected that many local chambers of commerce will assist in creating that public sentiment which is necessary if we are to realize the 'equal access' program.

"It would be very helpful also, it would seem, if there should be greater coöperation between organized labor and professional educators.

"Both AFL and CIO should be encouraged to include, in their programs and activities for a prosperous postwar world, expansion programs in the field of education. The labor movement, in earlier days, played an important part in securing general public education as an accepted part of the American way of life. The labor movement can, and should, play a rôle in raising the level of those services today.

"On the other hand, those of the educational profession can, and should, help combat the outbreaks of antiunion propaganda which occur in the press and on the radio from time to time. As Philip Murray pointed out at the Conference for Full Employment, 'The experience of the German people, and the people of all the occupied countries in Europe, has proved that before Germany overran Europe, these same methods [antiunion propaganda] were adopted by the Nazi party and its leaders. It shows also that certain business interests did coöperate with Hitler to destroy the democratic way of life throughout the world by first seeking the destruction of the trade-union movement.'

"The increased rôle which labor unions play in our country, their contribution to the war effort which has been publicly recognized by the War Department, and their willingness and ability to contribute to postwar prosperity in a coöperative manner make them a powerful force for progress which cannot be ignored.

"Labor and Business are finding their way to coöperation in the interest of the nation as a whole—in peace as well as in war. It is both possible and necessary that all groups coöperate to this end.

"If the 'equal access' program is to be realized it will be necessary that the entire nation, and all its organized channels be utilized for this purpose. If Business, Labor, and all forward-looking organizations make this program their own, the 'equal access' program need not be a Utopian dream. We must not forget that new winds are blowing in the world. The spirit of cooperation, as exemplified by the agreements made at Teheran by the three greatest powers in the world, is growing. Americans have learned to work together in war. We can learn to work together in peace for a cause that is near to the heart of every citizen—the welfare of the future generation, and of our great nation, the United States of America.

"Naomi Betts Willett
"Martinez Junior High School
"Martinez, California."

Society Conducts Membership Campaign

DURING October, communications have been sent to all secondary principals and city superintendents in California asking their coöperation in soliciting memberships in the California Society of Secondary Education from their teachers and administrative personnel. In addition, a committee of principals and superintendents is making a campaign for memberships through personal solicitation, emphasizing particularly the importance of

institutional memberships and group subscriptions.

This latter committee is pointing out that institutional membership in the Society is authorized by the State Board of Education under provisions of the Education Code and is recommended by the State Department of Education. The Committee is emphasizing, also, that every secondary school in the state should have such a membership so that the service which the JOURNAL, *Directory,* and other publications of the Society now render to secondary education in California may be continued.

Memberships in the Society are as follows:

INSTITUTIONAL—$10; entitles an institution to the $7 *Directory,* to a $3 subscription to the JOURNAL, to such monographs and all other publications as may be published; qualifies a school for the group subscription plan.

CORPORATE—$5; entitles any person participating in secondary education in California to a subscription to the JOURNAL and to such monographs or other publications as may be issued (exclusive of the *Directory*); qualifies the holder to vote and hold office in the Society.

ASSOCIATE—$2; entitles any person participating in secondary education in California to a subscription to the JOURNAL.

The cost of the annual *California School Directory* is $7.00. Since more than 100 orders for *Directories* were received by the Society last year than could be filled, reservations should be made this year during October or November if delivery is to be assured.

Subscription to the JOURNAL is $3.00.

The Group Subscription Plan is an arrangement whereby teachers in any California secondary school may secure individual subscriptions to the JOURNAL at only $1.00, provided that the school has an Institutional Membership and that one-third as many subscriptions or memberships are received from the school as there are members on the faculty.

From time to time, the Society publishes volumes in the *California Society of Secondary Education Monograph Series* and certain special bulletins—these usually vary in price from 25 cents to $1.00 each.

The P.-T. A. on Secondary Education

MRS. J. J. GARLAND, president of the California Congress of Parents and Teachers, Inc., and associate editor on the staff of the JOURNAL, submits the following points from the 1944-45 platform of the California Congress as being of particular interest to secondary schools:

7. Recognizing the educational value of out-of-school work experience, we suggest that high schools continue to develop programs combining constructive work experience with the course of study.

8. To meet the need for adequate counseling and guidance for youth of all ages, we urge that all teachers be given training in counseling.

9. We believe that the future security of this nation demands that all young men and women should be adequately trained for possible military service. We firmly believe that such specialized military training as may be desirable should be integrated with secondary and collegiate education and offered by high schools and colleges.

10. Public educational institutions should accept responsibility for providing educational and vocational guidance for men and women whose education has been interrupted by military and other war service and who are in need of further training.

11. Recognizing that discharged service men who are suffering from mental and emotional instability are unable to assume normal civilian responsibilities, we believe that the State and National Administrations should provide skilled guidance during the period of adjustment.

12. Realizing the magnitude and significance of the task confronting public education now and in the period of postwar adjustment, we believe that the schools must have adequate

financial support, proper physical facilities, and qualified personnel; and we urge that the school day and school year be not reduced.

Time for Renewal of Group Subscriptions

THE majority of group subscriptions to the JOURNAL expire during October or November. Schools whose subscriptions expire at this time should renew them promptly to avoid delay in receipt of their next issue of the JOURNAL.

The following rules govern the Group Subscription Plan:

1. To be eligible to participate in the plan, a school must have an Institutional Membership (costing $10, and for which the school receives all publications of the Society and the group subscription privilege for its faculty). Purchase of the Institutional Membership is authorized under Section 4861 of Chapter 15 of the Education Code.

2. The group plan price of $1 per individual shall apply when there are at least one-third as many subscriptions as there are full-time members on the faculty. A school may order as many additional subscriptions at the same price as it desires.

3. In the totaling of subscriptions to the group plan, any associate or corporate memberships held by members of the faculty may be counted as a part of the required one-third—each membership counting as one subscription.

4. A school's group subscription order may begin with any issue of the year—running for one calendar year thereafter.

5. The group list from a school is handled as a single order. A school can increase its order at any time, but all $1 subscriptions expire as one.

6. Since this is a group order, we do not need the names of individual persons participating. Because of a shortage of clerical help, we will not be able to notify you each issue as to who in your school are entitled to copies. You will have to keep the record of those participating and make the necessary adjustments as faculty members leave your school or new ones enter.

7. In case a member of the group plan leaves your school during the existence of the plan, notify us and we will reduce your order accordingly and then forward that individual's subscription to him at his new address, regardless of whether his new school has a group order; the status of your own school in the plan will not be affected thereby.

8. Magazines sent out under the group plan shall be mailed in one bundle to a single address—to the principal, to the library, or otherwise as designated.

9. Money for the group order shall be due and payable at the date of publication of the first issue for which the subscriptions are to apply.

During the past two years, an average of more than 1,000 teachers have received the JOURNAL through the Group Subscription Plan. At the present moment, 47 schools are participating in the Plan.

Next Month

NEXT month's symposium will concern itself with the timely and important topic of the teaching of United States history in the schools of California. It consists of three parts as follows:

1. An opening article by Professor Harold W. Bradley of Stanford University, summarizing the Wesley Committee study of the teaching of United States history throughout the country and laying the groundwork for an understanding of the California report which occupies the major portion of the symposium.

2. The report of the Subcommittee on United States History and Civics to the California Committee for the Study of Education. This lengthy document is an important piece of work and undoubtedly will play a significant part in the future development of United States history from the grade school through the university lower division.

3. An article by I. James Quillen of the Stanford School of Education, examining the position of United States history in the social studies program

and analyzing the recommendations of the Subcommittee in the light of the total program.

This symposium will be followed later in the current school year by a second number devoted to United States history. Consideration at that time will be given to methods and materials which can be employed at different grade levels in accordance with recommendations of the Subcommittee report. Also to be included in this number will be a discussion of evaluation in United States history courses.

Other articles to appear in November will be "A Course in Ninth Grade Orientation," written by Roy Cochrane of the Lassen Union High School, Susanville; "Building a Junior High Health Program," by Marion E. Taggart of the La Cumbre Junior High School, Santa Barbara; and "A Practical Program for Postwar Planning," by Harry E. Tyler, district superintendent, Santa Maria.

"A Progress Report on the Teaching of Aeronautics in California Secondary Schools" is the title of this month's symposium, the most recent in the series of articles and symposia which the "Journal" has devoted to the latest member of the secondary curriculum. The earlier articles were more or less promotional in nature, but the present symposium is concerned with taking stock of the progress that has been made to date and with anticipating the problems which will be met in certain areas in which expansion seems indicated.

Wherever possible, the articles included in this issue attempt to evaluate the various phases of the aeronautics program as it exists in California today. But at certain levels of the school system, the program has not developed far enough or is not crystallized sufficiently that evaluation of progress is possible or meaningful at this time. That the symposium might give a complete picture of aeronautics teaching in California to date—from junior high school on up through the secondary school and even including the university—articles are submitted analyzing the situation on all the various levels.

In general, then, the articles included herein are of two types: those which evaluate existing programs and those which analyze the problems faced by expanding programs, that future difficulties may be anticipated.

Opening the symposium is an excellent statement evaluating the place of aviation education in the curriculum, written by Frank B. Lindsay. Then comes a discussion of aeronautics instruction in the junior high school, by Dr. R. Will Burnett, followed by an article written by Miss Muriel G. Palmer describing the aviation project which she conducted in the Florence Nightingale Junior High School, Los Angeles. Following these two articles is a report on the success of preflight instruction in a small high school, by Frank M. Williams.

Dr. A. T. Bawden summarizes one junior college's experiences with the CPT Program to date, and Dr. F. M. Yockey reports on the present status and probable future development of aviation instruction in the adult program. A discussion of the part that the university will play in the future development of aviation is written by Dr. Baldwin M. Woods.

Dr. Cornelius H. Siemens writes a summary of recent research studies in the field of secondary aeronautics. The symposium closes with an article by Professor F. W. Hart, outlining a suggested program for the improvement of aviation teaching. Related to the subject matter of the symposium is an item by Dr. Loaz W. Johnson, included in the "What's Happening in California Secondary Schools" column of this magazine.

All credit for the planning and organization of the symposium goes to Dr. Siemens.

A Common-Sense View of Aviation Study

By FRANK B. LINDSAY

To date, discussion of the introduction of aviation materials into the secondary school usually has taken one of two extremes—either an overwhelming enthusiasm for such procedure or a scoffing at what is being done. It is appropriate, therefore, that this symposium devoted to the evaluation of preflight aviation in California should contain an article considering from a common-sense point of view just what claim aviation has to a place in today's curriculum. That this article might be written from an objective point of view, it was assigned to the man having responsibility for all secondary education in California, the chief of the Division of Secondary Education, State Department of Education.

Mr. Lindsay, before becoming chief of the Division and assistant superintendent of public instruction a little over a year ago, had served as assistant chief for several years. Before going to the State Department, he was dean of men and chairman of the Division of Engineering and Mathematics in the San Bernardino Valley Junior College. Because of his background in science and mathematics, he has been particularly interested in the manner in which teachers of these subjects are fitting aviation into their regular courses of study.

A RAIL-FENCE and an airplane may not seem to have much in common. Yet both are human inventions that have made history. A rail-splitter became president, and an aviator some time may hold the same office. Few rail-fences are lying about these days, so one is likely to forget their part in the making of America. But for a hundred years rail-fences marked the advance of the pioneers in the winning of the West. Not only were rail-fences everywhere the sign of the conquest of the continent; they made the conquest.

The discharged veterans of the Revolution came home to find their pre-Bunker Hill jobs gone or too humdrum after Valley Forge and Yorktown. So a great many shouldered axes, along with their long rifles, and headed for the Appalachian divide. Across the Alleghenies lay the Valley of Democracy, though nobody then knew it for that. It was just a wilderness full of wild game, Indians, trees, and opportunity. Arrived at a spot that suited them, they spit on their hands and felled trees. In a few years, the cabin in the clearing became a homestead among rail-fenced fields.

With rail-fences, any man with get-up could go ahead. He could pen up his pigs and shut out the deer and the neighbor's cows and raise a corn crop. He could bring up a family of tough republicans like himself. With a whole new country to fence, these veterans and their children wanted no paternalism in government, except free land for homesteads. They fought a Civil War because they could not stand the idea of anyone's being a slave in their country. For a hundred years the history of America was what rail-fences made of settlers who fenced a new world.

An airplane is something else again. Yet like the rail-fence it is the signal and symbol of the next century of America's future. A lot of young men

are coming back with bitter memories of Saipan and a hundred other hells of stinking death to haunt their nights. They want more than a pause between wars and just a job again. They want an America with a future. They will make this America, and the airplane is their instrument to do it. They will not have to put up with people at home who still are looking over their shoulders at the depression of the thirties. They will not be hemmed in by the world they left any more than were General Washington's ragged Continentals. There is this difference, too.

The pioneers of the later 1940's do not have to steer for the Cumberland Gap to gain their land of opportunity. The airplane has closed one era of ten thousand years of human history. Heretofore mankind always has had to crowd down river valleys or squeeze along seacoasts. Empires have been built by controlling bottlenecks in sealanes—as at Gibraltar, Suez, and Panama. But never any more, so long as man flies.

The present time closes a chapter that began with the Pharaohs and the sea kings of Crete. From Ninevah to Singapore, from Genghis Kahn to Adolph Hitler, there has been a continuity of history imposed by the lie of the land—mountain passes, prairies, rivers, and straits. From Hannibal to Rommel, war has had one pattern. But parachutists now swarm like locusts over any land, and warring navies are sunk without firing a broadside.

In the annals of mankind, the airplane has opened a new volume for peace as well as war. Because the World War has focussed attention on military applications of aviation science, the degree to which aviation already has affected civilian institutions and concerns tends to be obscured at present. The current devotion of business and transportation to production of military supplies and their distribution among the fighting fronts hides from a casual observer the advances of aviation into fields superficially remote from aeronautics.

SOME educators seem to regard those persons as slightly mad or at least given to absurd overemphasis who reiterate on every occasion the signal importance of aviation education. For perspective one may consider a somewhat parallel instance: the contrast between the United States of 1909 and that of 1939 and the effect of automobiles, sound-tracked motion pictures, and radio broadcasting on American living. The parallel is inexact in that a generation intervened between the administrations of Taft and the second Roosevelt; a whole people with one emotional set and social outlook for the most part passed away, and their children grew up into a new world. But 1939 to 1944 is another matter; most of us have not yet died, but continue to drag forward the hangover from the depressed thirties into new times. The situation has dangers for the nation—in politics, economics, and social affairs as well as in education, with which we are immediately concerned.

It is not suggested that any school should discard helter-skelter its curriculum and try to live only up in the air. Such a view of the meaning of aviation and of education mistakes the trivially spectacular for reality. An airplane is not usually employed in aimless flight. In itself, an airplane is of small importance. It is as a vehicle for human beings that an airplane has meaning both as an invention and as subject-matter in education. The significant thing is not that an airplane can fly with speed in any direction, but that it can discharge passengers with their prejudices and misconceptions so instantly at any spot to impinge these on the provincialisms of other people. For ex-

ample, not until now in all human history has the question had seriously to be raised: Can the world ever have peace again?

Resistance to consideration of the essential place of aviation in education can arise only because one gets bored with talk of motors and instrument panels and forgets the airplane in a clutter of its parts. The dilemma that confronts humanity is inescapable: either the peoples of earth bestir their apish minds and set to work to build a world-wide order or another World War III will bring hurtling from the skies winged instruments of death with which educators have been too lazy to be bothered. In the end a Pearl Harbor on a thousand schoolgrounds is bound to affect any curriculum.

So long as people might be herded on continents and only a tiny number sieved through the sealanes from one shore to another, the hates and delusions of mortal mind might be disregarded and national relations left to the diplomats. And like the neat picture in the minds of residents of the medieval world that ranked in tidy hierarchy from lowly serf to the Heavenly Father (each kind and condition of man), a curriculum could ignore the facts of human life without serious results. But now every child has a direct interest in each Cairo and Teheran conference. If the twentieth century is to be that of the common man, it is because he cannot help himself. For the airplane has decreed that mankind must conquer his bestiality and become human or perish; that is its meaning for education.

AVIATION education means, too, a reassessment of every subject, including the place of science in any pupil's program of studies. Time was when biology could be left to those who naturally took to bugs or trees. But the plane carries insect-hosts of disease as readily as persons with ideas to contaminate regions far afield. In home and community, people have to learn novel habits of cleanliness. On account of the airplane, health instruction has a new mission, not merely to make men fit for military service, but able to live at all. And a civilization that dumps into the sea each year in sewage the equivalent of more than a million tons of phosphate rock, already the weakest link in the vital chain that supports life, ignores biochemistry to its deadly peril.

It is a terrible predicament in which the airplane has placed man: he must use his mind. As reflected hitherto in the curriculum, people have employed their minds comfortably in pursuit of mostly useless knowledge. For example, poetry often has explored the ego-adulating states of a lover who acutely anticipates union with a current object of affection. Such literature is not without charm and psychological interest. It confirms, on the one hand, the nearness of human nature to the strivings and emotional drives of other animals. But the purposes of humanity can be realized only through the sense of interdependence which science clarifies.

Though science frees experience from the idiosyncrasies of particular persons and circumstances, it does so only to make experience usable again in other personal and immediate affairs. To illustrate, aviation makes clear as never before the reality of the communities of nations grouped about the Atlantic and Pacific Basins. The essential fact is not that nearly the whole earth is only a day's jump away from California, but that residents of Wasco now have as neighbors inhabitants of Chungpa, Omsk, Ratnapura, and Subiaco. Either they will visit as friends, or they will come as destroyers.

In 1943-44, 194 California high schools maintained classes in aeronautics with an average enrollment of

25 pupils per section. Thirty-two high schools, in addition, had work in aircraft maintenance.

The experience of California high schools in introducing aeronautics has been heartening. Secondary educators have shown that they can readjust schedules and curricula to meet new demands. Teachers have discovered that they can present successfully hitherto unfamiliar materials. In this connection, an educational paradox may be noted. Although instructors expect pupils to embrace with the eagerness and persistence of Kipling's "Explorer" strange and surprising information, too often these same instructors are hesitant to try to impart novel and vital formulations of current human thinking. It is questionable whether fossil minds can quicken youth to adventurous achievement.

SOMETIMES teachers of music, art, and literature express fears that the renewed prominence of mathematics and science in war-time programs may lead to continued neglect of humanizing studies. Actually the supposed catastrophe which has overtaken the humanities can be the best thing that ever happened to them. In America, art, literature, and music have never succeeded in clearing their reputations of the imputation that they are harmless hobbies for leisured people. Constantly these studies have been attacked as the fads and frills of schooling. Now is the time for teachers of these subjects to show that literature embodies the thinking of people in a democracy; that art is the expression of their democratic ideals in the utensils of their daily affairs; and that music portrays the emotions these people experience as they live here. So presented, the fine arts can assure themselves of a fitting place in any curriculum, for they will be making essential contributions to the building of civic responsibility, vocational efficiency, and family membership.

Likewise, the preferred position which mathematics and science momentarily enjoy imposes responsibility on teachers of these subjects to recast their disciplines in modern terms and for current usage. One would be justly critical of a course in high school literature which confined itself to the Greek classics, Dante and Petrarch, and the Elizabethan age. Yet mathematics courses rarely get beyond Euclidean geometry, the algebra of the Renaissance, and the analytic method of Descartes. Little serious attempt has been made to determine what mathematical progress could be achieved by secondary school students in terms of the requirements of modern technology.

The advent of aviation introduces a catalytic agent into the educational process which makes imperative the immediate reformulation of content in every high school study.

THROUGH the coöperation of the Civil Aeronautics Administration, committees of experienced classroom teachers, curriculum workers, and principals of elementary schools, high schools, and junior colleges met last April at Berkeley for a three-day session. They discussed their experiences with aviation education and projected future developments. In a volume to be issued by the State Department of Education, their reports are presented to California educators for consideration. In this article there has been no attempt, as is evident, to summarize their thinking. Instead, your chief of the Division of Secondary Education has preferred to set forth some reasons why the report of the three committees should be read and appraised carefully, in the hope that school people in varying ways may go and do not likewise, but better.

P-38's in the Junior High Curriculum?

By R. WILL BURNETT

THE story is told of a traveler who came to the end of a paved highway during the middle of California's famed season of precipitous fog and found the road ahead of him muddy and deeply grooved with the ruts of vehicles that had gone ahead of him. As he got out of his car and looked down the road he soon would travel, he noticed a crudely penciled sign that someone had placed by the side of the road. It read: "Traveler, choose your ruts with care. You will be in them for the next 20 miles."

We are well into an age of flight. War has catalyzed the normally more slow technological developments of aviation to the point where, even if no further technical advances were made for a decade, we would find our lives tremendously modified in many of its major aspects. Change is hard to see when we are living and participating in an age of such tremendous flux and flow. Yet, to all but the intellectually blind it must appear obvious that aviation is having and will increasingly have great impact on our economic, social, political, and personal lives.

As yet, however, education for this age of flight has been tentative, probing, and largely incidental to other aspects of life more firmly established through tradition in the curricula of our schools. This is, of course, as it should be. For we, like the traveler, stand on the threshold of new paths. And as surely as ruts form in a muddy road, the experience of schools which do incorporate aviation education into their curricula will jell into patterns that—good or bad—will tend to set the general tone and procedures for the schools which follow.

Inasmuch as aviation education at the junior high school level is only in its beginning today, there is little yet to be done in the way of evaluating a set program at this grade level. The author of this article, therefore, uses his section of the symposium to analyze the possibilities of junior high school aviation instruction and to point out in advance some of the pitfalls. His article also is of interest in that it tells of the Stanford-CAA project in the developing of a source book of aviation materials suitable for the elementary and junior high school grades.

Dr. Burnett is an assistant professor of Education at Stanford, his chief work being in the field of science education. He is serving as chief consultant in science on the project mentioned above. As chairman of the Resolutions Committee and chairman of the Committee on Aims and General Procedures of the National Science Teachers Association, he is particularly interested in the problem of aviation education. Before going to Stanford, Dr. Burnett had been head of science departments in various Mid-Western high schools and had served as research associate in the Bureau of Educational Research in Science and as instructor in Teachers College, Columbia.

The creation of that future America is the task of education. We shall be men of the world—we Americans—in this air age. But how shall we get on with the world, how the world will like us, what we can do in our

intercourse with foreign nations to build a better order of things—these will be the problems of those who shape the minds and attitudes of the new generation.

The airplane will get Americans there and back—quickly and cheaply. It is for education to determine what sort of Americans they will be. Americans in the past have made America great. And only great Americans in the air age ahead can win for America the world's confidence and affection.[1]

It is appropriate, therefore, to consider the potential values of aviation education in the schools and to hazard certain suggestions for the critical consideration of those in the schools who lead and work with young people. The ruts—good or bad—probably have been rather deeply worn by now in the senior high schools because of the war-time importance of preflight aeronautics courses and the consequent stress placed thereon. Our attention for the present, therefore, is directed to aviation education in the junior high school. For it is here particularly where tentative modifications are being proposed and tried and where, during the next few years, aviation education increasingly will be written into experiences and content planned for young people.

WHY include aviation in the junior high school at all?

For one thing, we cannot avoid it. Children *are* living in an air age, and the airplane is as definite a part of their environment as the locomotive or the automobile. It is true that relatively few of these children are flying, in the actual physical sense of the term, but their thoughts are often skyward. Any teacher of these youngsters knows how common are the questions, the expressed interests, and the actual knowledge they have about aviation. The teacher may be uninformed about black-outs, red-outs, and the number of G's that a new fighter plane can stand. But not the Johnnies, Jimmies, and even the Maries in her class. The comics the children read, the adventure books, the movies they see, and even the radio give them fact and fiction of flight.

In short, the children are living in an exciting age of flight, one in which the airplane seems as natural a part of the environment as the automobile did to a generation only slightly older. And they want to know more about aviation. The Stanford School of Education recently made an extensive investigation of children's questions on aviation. The range of interests and the penetration of the questions expressed is truly surprising to us of an older generation. This, then, is the simplest and most obvious reason for including aviation in the curriculum of the junior high school: Children have many interests, questions, misconceptions, and ideas on which they want informed and intelligent assistance.

THE very fact of this general interest in aviation on the part of young people is at the same time a possible danger to sound curriculum construction.

It has been suggested, for example, that aviation might be used profitably in the science aspects of the junior high curriculum to motivate the student to study the laws and principles of an organized science. In other words, aviation might be used as the springboard whereby students are plunged into a logically organized discipline. This reflects what, to the author, is an unfortunate and educationally untenable viewpoint of science teaching in general education. It either implies that there is something virtuous or worth-while in the organized data of science as such or at least comfortably ignores the prime curriculum job of determining to what problems, interests, or concerns each datum of science may be directed for the better living of the youngster who is expected to study it.

[1] From a recent address by Juan T. Trippe of Pan American Airways.

Certainly, if experiences and content in aviation may be directed toward the elucidation of a principle of science that has ramifications and implications in other aspects of the life of a child, such values and usage are not decried. But to challenge the child's interest through the study of lift on an airfoil so that he will study and verbalize Bernoulli's principle more willingly, in and for itself, is indefensible and totally unfair to the youngster.

There is a second possible danger in certain tendencies of interest expressed by children during these times. War-time aviation is largely dissimilar to peace-time aviation. That is, such problems of physiological fatigue, aero-embolism, anoxia, redouts, and black-outs as well as many problems of plane design and performance that are encountered in military necessity are seldom encountered in peace-time aviation except for experimental and certain atypical purposes. There is a certain danger that the child, growing up in war time and on a partial diet of movies, comics, and stories dealing with war-time aviation exploits, may develop a narrow and overdramatized idea of aviation on the one hand and too little awareness on the other hand of the real drama in the march of human progress as represented in peace-time aviation.

But the child is where he is. We can only recognize the situation and stimulate his interests toward more constructive and personally valuable lines of experiences and learnings than he would tend to take if left to himself.

WHAT are some of these values in aviation education that thread deeper than that of satiating the child's interest in his immediate environment and the phenomena of physical flight? The listing could be made quite long and well defended. But perhaps it would be better to suggest just a few major situations and problems where our prime attention well might be directed in looking ahead to the incorporation of aviation in the junior high curriculum. Even these must be treated briefly and inadequately here.

Mr. Trippe, in his statement quoted at the beginning of this paper, focussed our attention on one major problem which is yet a composite of many. The airplane has shrunk our world and will continue to shrink it. This has been said so often and in so many ways that it is in danger of becoming a cliché. And the trouble with clichés is that so often they are passed off as representing an understanding. We must be very certain that this does not happen to this particular fact. For unless we develop a far better understanding of the major implications of our shrinking globe in an air age than we adults have had, we face serious problems that will be solved against our best interests by default.

Most of us are aware, by now, of the distorted impression of our earth that we have received through studies of distance and position on Mercator's projections. Azimuthal projections or study of geography through globes helps us to understand the inadequacy of a map made for certain purposes when used for other purposes such as determining position and distance in an air age.

There is another distortion, or rather vestigial impression, that most of us have developed through our own formal education that is more difficult to eradicate. That is the idea that distance is only measured by units of linear distance such as miles. It is still far easier to think of the distance from San Francisco to New York or Berlin in terms of thousands of miles than it is to think of it in terms of hours of air travel. Yet—and we must face it—miles-distance between San Francisco and New York is dangerously misleading and is essentially meaningless unless we are trying to plot how much land there is

to be tilled or lie fallow or to be used in some such fashion.

Really, miles-distance—in an age of flight—should more appropriately be used in considering acres of this or that type of land or the linear distances between two nearby points for purposes of community or regional planning, districting of schools, or other governmental activities. For certain purposes it is far more exact and intelligible to speak of the distance between Los Angeles and San Francisco as two hours than to think of it as 400 some-odd miles.

This point is important and merits consideration by all leaders of young people, for it is the basic fact which has made obsolete many political, economic, and social customs and arrangements of the past. Like it or not, the peoples of the world are thrown closely together. With the giant cargo planes of the very near future and the more finely laced transport lines nationally and internationally, we are going to be forced to live in essentially close proximity to the peoples of the world.

Thus, aviation education in the junior high school must not be a narrow preflight aeronautics type of thing if it is to provide the informed intelligence that will be required by these young people. Aviation education must be considered broadly as education fitting young people to live in a world influenced by the modern airplane. In the writer's opinion, it has been extremely unfortunate that so much of the aviation in the senior high school has been a more or less diluted pilot training course *and nothing else*. We must be very certain that we do not consider aviation education for the junior high school only as a further dilution of the technical aspects of aerodynamics, meteorology, navigation, aircraft construction, and design.

IF we consider aviation education for the junior high school as a part of the general education necessary for the fullest possible enjoyment and control by young people of their life in an age of flight, we can single out the specific contributions that aviation content and experiences might make to every aspect of the school program.

We will realize that the language arts program as a "tool" subject developing greater facility in symbolizing man's thoughts and feelings and in expressing his ideas and communicating facts and attitudes well might incorporate materials from the age of flight wherein many of our attitudes and ideas of today find their origin and expression.

We will realize that the quantitative thinking of the field of mathematics and the precise expression and communication that is possible only by the aid of mathematics well might incorporate materials from the field of aviation. Not—it is reiterated—to stimulate a child to do work or to learn quantitative verbalizations of no worth in his life, but precisely because certain mathematical competencies are essential for his optimum understanding of the age in which he lives and successful and happy participation in that age.

It is particularly important that teachers and specialists in the social studies and the natural sciences consider carefully and well the requirements of living in an air age and develop their curricula so that young people may be provided developmental experiences which will result in growth in ideas and knowledge appropriate for modern living. Historical accounts of economic, social, and political institutions and their growth must be projected toward a better understanding of present life and the necessary adjustments for a stable future. We must increase our attention to the study of peoples and their cultures and inter-

dependencies in the age of flight. Anthropological and genetical data should be adduced to destroy the myths of racial, national, ethnic, and religious superiorities if we are to learn to work coöperatively with the peoples of the world.

Influence of the airplane on the health, safety, commerce, culture, and recreational patterns of peoples must have its place. Aviation is a major industry today and will be tomorrow. Realistic considerations of vocational possibilities should be made available, therefore, for young people.

Aviation education for the junior high schools must not be just a study of P-38's and their equivalents. Our children must learn that the airplane is equipotentially an angel of mercy or an angel of death. They must be aided in developing the understanding that will provide them with the control of their lives in an air age so that they will coöperate with the peoples of their own community, region, nation, and this small world for harmonious development of a better life for us all. The study of P-38's will have its place. The study of aerodynamics will have its place. But their place will be that of satisfying curiosity, stimulating and feeding the native gift of imagination and interest that is in young people, and in providing a clearly seen, factual basis in the natural phenomena of aviation for a better job of social engineering and personal development of each youngster in the future.

THESE brief comments reflect the basic spirit and purpose behind the preparation of an educational document produced by the School of Education, Stanford University, for and at the request of the Civil Aeronautics Administration. This document will be published in several volumes by the latter organization. It is, essentially, a source book for use by educators in preparing textual materials and curricula for the children of the elementary and junior high schools in this country. This document presents a rich range of content and activities in five subject-matter areas: social studies, science, language arts, mathematics, and arts. A brief chapter on music also has been added. The material is so organized that schools using either a subject-matter or an integrative or problem-centered approach will find it of value.

First attention in this material has been given to the curriculum pattern in each of the areas covered. The basic aims underlying each subject-matter were made explicit. Charts follow the running account, showing the development of each of these areas in the three typical administrative groupings of the elementary and junior high school: kindergarten, Grades 1, 2, and 3; intermediate grades—4, 5, and 6; and the junior high grades—7, 8, and 9. Within each section there are five chapters; one chapter being devoted to aims, content, and suggested experiences for each of the five subject-matter areas.

Only the use by teachers and authors will determine the ultimate value of these volumes. Fundamentally the document was requested by the CAA and was prepared by the School of Education of Stanford University to make explicit the potential values of aviation education in these grade levels and to suggest content and experiences which will implement these values and provide a critically developed source of materials for educational use in an age of flight.

The Japanese Learned English

For every American who had a working knowledge of Japanese in 1941, there were 100,000 Japanese with a working knowledge of English.

An Aviation Project in a Junior High

By MURIEL G. PALMER

Most discussions of secondary school aviation instruction have dealt with the high school or with the junior college level. The present symposium has nothing to report in the way of evaluation of junior high school activities in aeronautics, but the project described in the accompanying article is offered as representative of the type of thing which can be done and which is being done increasingly in the middle grades.

Miss Palmer, who tells of the activities of one of her classes, is a teacher in the Science Department of the Florence Nightingale Junior High School, Los Angeles.

THE students of Florence Nightingale Junior High School are aware that man has approached many new frontiers because he has learned to use the air. This fact is highly interesting to them, and it offers the members of our faculty an opportunity to divert their minds from the very pressing matters which disturb even children today. In the world of adults, as everyone knows, misery and distress rule the day; a sense of insecurity and of uncertainty, consequently, carries over into the world of our children.

In one particular class in our school, the students expressed a compelling desire to plant their feet firmly within some area of tangible accomplishment in school or out of it. Realizing it was desirable for this need to be met in school, we devoted much time and effort to the discussion of a suitable program of study for the group. The topic of aviation seemed to command the largest amount of interest from the members of this class, the majority of the group indicating a state of readiness for "research" work in this field.

OUR students gave these as their chief reasons for finding themselves well disposed toward this subject: First, having rather repeatedly investigated their surroundings, most pupils were anxious to open new doors—for the purpose of exploration, for some training in an occupation they might enter by choice, or because of the requirements of the Air Services at war. Second, older children desired more direct or more realistic contact with grown-up activities, especially those tied into the dramatic events of today. Third, students of junor high school maturity are able to adapt themselves most intelligently and most happily to the environment of the air age.

Having accepted these premises, the class and the teacher began the collection and the accumulation of all kinds of objects and of all sorts of magazines, pamphlets, and books available on the subject of aviation.

We selected the descriptive title, "Nightingale Ground School and Cadet Training Center," as a means of helping to set the stage, of delimiting the area of study, of arousing greater interest, and of suggesting a meeting ground for pupil and subject-matter. Other devices were employed to introduce and to assist in development of the theme—exhibits of various numbers of aircraft models and of films and film strips, exposure to up-to-date reading matter,

and talks by visitors on leave from military duty represent a few examples.

THE class proved that it was enthusiastic over our project by bringing in supplies in such quantities that we were overwhelmed. This condition of affairs called for the organization of ourselves and of our possessions. This we did at once.

Practically every member of the class had some different reasons for wanting to study aviation, so we formulated and compiled the most important objectives we sought into a composite form to provide the bases for our inquiry. The following statements are listed to represent the aims of the class:

1. To develop a vocabulary of common terms used in modern aviation.
2. To build a scientific background of basic information dealing with aviation and the subjects related to it.
3. To create an awareness and a knowledge of the global aspects of military and of commercial flying and to be able to use the knowledge gained.
4. To be able to sense the importance of the impact of the airplane on society and on its institutions.
5. To become more air-minded and to be capable of aiding in the further advancement of air-mindedness by relating aviation to continued problems of national defense and to America's plans for the future.
6. To have a knowledge of the many possibilities of gainful employment in aviation or in allied lines of endeavor.

THIS presentation of the objectives we set for our efforts has given the reader the explanation and the abstract of our plans and our purposes. Now, the point has been reached where we may enter into a description of the subject-matter and the techniques which were applied to accomplish the task imposed upon ourselves.

We soon learned that application of the scientific method was necessary if we were to acquire the knowledge sought. The quantity of material on hand was too great to be of use to us until it was put in organized form. It was necessary for us, therefore, to place in outline arrangement the topics we were to consider and the steps of procedure for solving problems.

In the process of assimilation, experience taught us, it is best to start where the pupil is mentally. This meant that we were interested in any worthwhile phase of aeronautics which appealed to the children or gave impetus to their work, though on the one hand it might be such simple pursuits as watching to see why a kite flies or learning the insignia of airplanes, or on the other the more complex problems of finding the principle of lift or discovering how the magnetic compass is made. Many students were able to forge their way quite deeply into the subjects of airplane engines, aerodynamics, avigation, structures, airports, airways, communications, instruments, and so on.

The step from these fields of research in aviation to those of astronomy, meteorology, health, energy and power, conservation, and national defense was essential and natural because of the relationships that exist among these areas.

A SURPRISING number of children made contributions to the complete and the specialized library we maintained within our room. Research work in aviation required the use of many forms of explanatory, fact-finding, descriptive, and pleasurable reading materials. Very few pupils were at the same level of ability or of information; and, consequently, each one had to be furnished with sources which were suitable to his status. We, as a class, prepared and utilized files, recording much-needed facts and suggestions under such headings as Objects Constructed, Modern Films, Beneficial Printed Matter, Valuable Sources of Supplies, et cetera.

Diversified methods of working on

the various topics or on the problems they induced were utilized. A favorable learning situation was more nearly approached and the subject-matter was more clearly comprehended by the pupils when variety was introduced and continued by such means as the following: using a question-and-answer box, demonstrating with homemade objects, dramatizing scenes, drawing diagrams, and employing diverse ways of testing—for example, the Sky Quiz idea.

Formerly, the students of the science classes of our institution took trips to airports, factories, training centers, display places, and airplane shows, but because of present conditions they have been forced to substitute for these visits a suggestive atmosphere in the classroom. We did our best to make the room in which the group met to study aviation as serviceable as possible as a workshop, an air school, an experiment station and laboratory, an airport, and, finally, a show center.

IN order to find an opportunity to summarize and to evaluate the total accomplishments of the group, we decided to produce an air show. Every aspect of the subject of aviation that we had studied was covered in the exhibition. The walls of the room were lined with diagrams which were made to assist in clarifying matters like the following: how an airplane can be flown from Los Angeles to Santa Barbara, in what ways the shapes of the wings of modern airplanes are classified, aids which are provided for pilots, flying blind to land at airports. Exhibits were arranged to show all the types of materials used by the students in their class work and to show why they were needed and how they were used.

Experiments were performed, employing such articles as the class-made wind tunnel, the venturi tubes, the propeller thrust apparatus, the fuel injection model, the control model, and the instrument panel. The members of the class gave demonstrations of such activities as the planning of a course in the air, the purpose of the weather station model, the differences in the three forms of airplane construction, and the manner in which the pilot is aided during flight by the radio beacon. Each pupil was in charge of a booth, and he took part in the air show, conducting himself as a citizen of the air age should.

After the completion of our study of the topic, aviation, we are certain that each individual felt the urge to go forward to meet the new day with deep interest, with basic knowledge, and with an awareness of having become more truly air-minded.

Education in the Party Platforms

Through the efforts of the National Education Association and the vigorous coöperation of many state education association leaders, pleas were made before the resolutions committees of the Republican and Democratic national party conventions, for inclusion in the two party platforms of clearly worded, straightforward educational planks directed at strengthening the public schools in our country. Results of these efforts are expressed in the following statements taken from the two platforms:

Republican—"The measures we propose shall avoid federalization of Government activities, to the end that our States, schools and cities shall be free. . . . . Educational progress and the social and economic stability and well-being of the farm family must be a prime national purpose. . . . . We approve, have supported and have aided in the enactment of laws which provide for . . . . education and vocational training" [for veterans of this war].

Democratic—"We favor Federal aid to education administered by the States without interference by the Federal Government."

Preflight Aviation in the Small High School

By FRANK M. WILLIAMS

It is but seldom that we are able to evaluate any phase of our high school teaching in terms of its effect on the later lives of our pupils. The present article, therefore, is of unusual interest, for it reports the present whereabouts and vocational status of the sixteen students who completed the 1942-43 preaviation program at the South Fork Union High School, Miranda. Frank in its evaluation of the preflight program in this small high school, the article is a valuable part of the present symposium.

Mr. Williams, who writes the article, is principal of the South Fork school.

EARLY in the spring of 1942 the authorities of the South Fork Union High School (a school of less than 100, located about 25 miles from the Pacific Coast, at Miranda, California) became convinced that the best interests of its students and of the national government would be served by the introduction of a course in preflight aviation, open to juniors and seniors and replacing the regular chemistry course scheduled to be taught that year.

All kinds of questions arose as to content, text, equipment, and so forth; and in an attempt to solve these, the principal, who had been a science and mathematics teacher for many years, attended a two weeks' conference at the University of California, Berkeley, where a general discussion of the problems of preflight training was held. Out of this experience was developed the course which opened with twenty-two students in August, 1942.

The course consisted of a three-period offering—one period of theory required of all who took the course, one period of shop open only to those in the class in theory, and a class in advanced mathematics to which other students were eligible, and in which only those students could enroll who could qualify through having had both algebra and geometry. A few exceptions were made to the rules when it was felt that certain students would be benefited by the instruction.

Enrolled in the theory class were twenty-two students, these later dropping to sixteen; in the shop there were nineteen, these dropping to fourteen; and in the mathematics class eleven, these dropping to ten. The shrinkage in the classes resulted from a shrinkage in the enrollment of the school, because of a population shift from rural to urban centers, and from elimination.

AT the outset, it was made plain that the instructor was not an aviator; that he had had no experience in flight; that the course was new to him as well as to the students; and that the whole venture was calculated to assist the students to better chances in aviation and particularly to aid them in the armed forces, where their services probably would be needed.

For text we used a few copies of Pope-Otis[1] until the Air Education Series of texts was printed, when we adopted the *Elements of Pre-Flight*

[1] Francis Pope and A. S. Otis, *Elements of Aeronautics*, World Book Company, 1941.

Aeronautics for High Schools.[2] A few weeks of work with this text convinced us that it was not what we desired, so we purchased *Science of Pre-Flight Aeronautics for High Schools,*[3] of the same series, which we found well adapted for what we wished to do. Educational materials in the form of film strips, films, posters, pamphlets, et cetera, were used, but the class recitation from the text was the rule. As to the adequacy of the text, several of the students since their induction into the Air Corps have written for their "Red Book" (*Science of Pre-Flight Aeronautics for High Schools*), stating that it is a much better text than was available in the colleges they were attending, even though it costs less than $1.00.

A library of aviation books was started, and at the end of the course it contained some forty volumes, costing about $100. This library was used continuously, and the matter of correlated reading was no problem in the course.

The shop class devoted its time to the study and construction of airfoil shapes, wing-tip forms, mechanical devices, and large scale model sections. This group constructed a large wind tunnel and a lift and drag scale on which these models were tested. Quality rather than quantity was the standard, and students' manual work was praised highly by persons experienced in airfoil testing. No "model planes" were constructed.

The mathematics class attempted to cover the more usable and practical portions of trigonometry and mathematical physics, with special emphasis on problems in surveying and navigation. Some work with advanced algebra was attempted, just enough to stimulate students to the solution of some of the more complex aviation formulae. This was followed by a three-month practical course in blueprint reading and interpretation.

OF the sixteen who were classed as finishing the course, thirteen took the CAA examination in the spring of 1943. These tests are given in four subjects: civil air regulations, navigation, meteorology, and service and operation of aircraft. Of the thirteen, one passed three tests, six passed two tests, two passed one test, and four passed none.

It is interesting to note that not one student passed the test in meteorology, although several obtained scores very close to the passing grade. This failure might be laid to the fact that the teacher had taught general science many years ago with its old concepts of weather, which do not lend much to the teaching of aviation meteorology. This being the only portion of the course of which the teacher felt he had mastery, he failed probably to carry on the class as a democratic project that produced the "we" spirit instead. It is likely that he slipped into an autocratic teacher-pupil situation that failed to stimulate the highest effort on the part of the pupils. The teacher's explanation of this failure was that there is very little coördination between the CAA test and the text.

A short analysis of the results of the course show that it was popular with the pupils, that they worked faithfully, and that they felt they were getting something they wanted because they wanted it, and not because someone thought they should study it. A check-up on what these sixteen pupils are doing now shows surprising results and indicates that the course was worthwhile. First, it should be realized that these students all were rural boys and girls, that none of them had ever flown or been near an airplane or airport, that while some of them were very good students others were very poor, and that

[2] Aviation Education Research Group, Teachers College, University of Nebraska, The Macmillan Company, 1942.

[3] Aviation Education Research Group, Teachers College, Columbia University, The Macmillan Company, 1942.

the group was an average group of junior and senior students in an average high school.

The following tabulation of data, with regard to the sixteen students completing the course, will help to complete the picture of how effective were our efforts in the preaviation field:

Student	Class in School	Approximate I. Q.	Nature	Curricular Status	10 Months After End of Class
A	12	105	Trouble maker	Not college material	Naval air cadet
B	12	110	Fair student	Not interested in college	Army air cadet
C	12	130	Fine student	College preparatory	Army air cadet
D	12	90	Very poor student	No interest in anything	Army air cadet (did well in college preflight)
E	13	100	Fair student	Interest in mechanics	Army air cadet (did well in college)
F	12	100	Fair student	Not recommended to college	In University of California doing well in meteorolgy
G	12	130	Eccentric student	College preparatory	Navy V-12 air cadet
H	12	105	Fair student	Not college preparatory	Army air cadet
I	11	110	Fair student	Not college preparatory	In high school now, trying to get into Army Air Force
J	13	90	Very slow	Not college preparatory	Army Medical Corps
K	12	95	Very slow	Not college preparatory	In junior college
L	12	97	Slow	Not college preparatory	Gunner mechanic, Army Air Force
M	11	108	Fair student	Not college preparatory	In high school now, trying to get into AAF
N	11	112	Good student	College preparatory	Army air student
O	13	110	Fine student (girl)	Not college preparatory College preparatory	In college, hopes to be air stewardess
P	11	130	Fine student (girl)	College preparatory	In high school, preparing to join the WAFS

Of the sixteen, nine are now in the Air Forces, eight as cadets; five others hope eventually to get into air service. Two have no desire to fly.

FROM the facts enumerated above, this instructor concludes:

1. That the aviation course as taught in the South Fork Union High School in 1942-43 was, from a practical standpoint, very successful.

2. That the teaching of preflight aviation is well within the capabilities of a thoughtful science-mathematics teacher.

3. That there are adequate texts available for the teaching of the course, although the coördination between texts and CAA tests is not too close.

4. The interest and enthusiasm of the students are such that there is no problem of discipline in the course.

5. That there is a greater satisfaction from the results of this course than from the results of most high school courses.

The administration concludes:

1. That the teaching of preflight aeronautics is practical in a small high school.

2. That the cost of text and supplemental material is less than for most high school courses.

3. That student interest is great enough to overcome conflicts in schedules and programs.

4. That the success of students in subsequent college courses (students who were not college preparatory students and were not doing accredited work) indicates that the subject qualifies as a college preparatory subject.

5. That the course should be offered every other year, although attendance of the school is now around fifty-five.[1]

[1] To alternate with other science courses.

National Council for the Social Studies to Meet

The Twenty-fourth Annual Meeting of the National Council for the Social Studies will be held in Cleveland, Ohio, November 23-25. The meeting will be focused on the problems and issues facing social studies teachers as we return to an era of peace.

Junior College CPT: Past, Present, and Future

By A. T. BAWDEN

By highlighting the events which have characterized his college's participation in civilian pilot training programs since 1939, the author of this article evaluates in a startling manner the success to date of flight training programs in the junior college. His article makes interesting reading, and it lays the foundation for the type of program which should be established after the war. It should be noted that in writing this article Dr. Bawden speaks from first-hand information, for he acted as coördinator for the Civilian Pilot Training Program in the Stockton Junior College.

Dr. Bawden is principal of the Stockton Junior College. He is the editor of a widely used set of aviation study guides and of the book, "Man's Physical Universe." Before assuming his present duties, he had been professor of chemistry and chairman of the Science Division, College of the Pacific and Stockton Junior College. Prior to his coming to California, he had been, successively, head of the Department of Chemistry at Ottawa University, head of the Science Department at Baylor College, and professor of chemistry at the University of Shanghai.

SEVERAL years ago the author was present at a meeting in which the requirements for a civilian pilot training program were being discussed. One of the men present who owned his own airplane which he could not use because of the coastal flight restrictions stood up and said, "I do not like to study. I do not want to wear a uniform, and I am allergic to military drill; but I want to fly, and if I have to do all of these things in order to fly, then I will do them." In somewhat the same spirit, the colleges of California have carried on their aviation programs.

It is a compliment to the progressiveness and flexibility of the colleges in California, especially the junior colleges, that so many of them entered into the Civilian Pilot Training Program when it was inaugurated in 1939. Had they known what lay ahead, unquestionably they would have pursued the same course; but their subsequent participation in various phases of the pilot training program have involved their doing and enduring many disagreeable things.

THE following is a chronological account of the highlights of the pilot training experiences of one California junior college. In most respects it is representative of what other junior colleges in the State have undergone.

1. *Air-Conditioning the Science Staff Members.* When the Civilian Pilot Training Program was inaugurated in 1939, California junior colleges, with a few exceptions, had had no previous experience in pilot training. Trained and credentialed ground school instructors were not available. In most cases, as a result of this fact, science instructors were assigned to serve as ground-school instructors and coördinators. During the next four years, many of these men gained invaluable administrative experience and a broadening of their horizons, all of which fitted them to meet the challenge of the air age.

2. *Air-Conditioning the Students.* During the first year it was difficult to find enough qualified students to fill the quotas, with the result that the CPT coordinators became experts in the fields of advertising and salesmanship. They went out to the highways and byways in search of trainees. They arranged for free airplane rides and, in general, did everything possible to make our young people air-minded.

3. *Air-Conditioning and Pilot Training Are Recognized to Be Essential to National Defense.* The war in Europe soon convinced far-seeing, clear-thinking educators that aviation would play an important part in World War II and that the United States would lack a trained reserve of pilots unless something could be done to remedy the situation. The colleges entered into Civilian Pilot Training during this period with a vigor born of the conviction that this was the greatest contribution they could make to national defense.

4. *Air-Conditioning the Draft Boards.* Then came the initial period of inductions by the draft boards. Many draft boards interpreted selective service to be the drafting of young men. Draft board members seldom appreciated the importance of aviation and sometimes considered that young men were entering the CPT Program to escape the draft.

As a result, there was a period in which the colleges had to educate the draft boards. The colleges entered upon this task with the spirit of the patriot, believing that every pilot trained and saved for aviation would be worth fighting for.

5. *December 7, 1941, Finds the United States Unprepared.* The colleges of California will not forget Pearl Harbor, nor the fear of Japanese bombings or of a possible invasion; and partly will they remember these events because they resulted in the closing down of all civilian flying within the 150-mile strip of California paralleling the Pacific Coast. There was no longer any question about the need for pilots, and the majority of colleges felt that the Civilian Pilot Training Program should be continued in order to furnish to the Armed Services a reservoir of young men of proved ability.

6. *The Exodus.* After a period of uncertainty, the Civil Aeronautics Administration finally made it possible for the colleges to establish programs outside of the 150-mile zone. Special acts were passed by the State Legislature enabling the colleges to operate programs outside of the state and making it possible for them to obtain special credentials for ground-school instructors. A few colleges dropped their programs at this time, and many other colleges would have done so if it had not been for a mixture of patriotic duty and self-interest which impelled them to continue. The colleges were losing their young men rapidly and saw in the Civilian Pilot Training a possible source of ADA and, perhaps, added income that would enable them to survive the emergency.

7. *The Colleges Become War-Conditioned.* The expansion of the Civilian Pilot Training Program in the spring of 1942 required a corresponding growth of the CAA Civilian Pilot Training organization. During these hectic days the colleges received an initiation in dealing with Government agencies which should have prepared them for later developments in the program. It was a new experience for college representatives to be asked to travel long distances merely to be told that their quotas had been cut. It was hard for the colleges to take the arbitrary decisions and the lack of consideration which characterized this period, but they realized that "there was a war on" and accepted the situation. Had they known what lay

ahead, however, many of them would have dropped their programs at this time rather than be a party to the events of June, 1942.

8. *The Army Takes Over.* In the spring of 1942, it was announced that all CPT trainees would have to join the Army Air Corps Enlisted Reserve Corps in order to continue with Civilian Pilot Training. As a result, the colleges not only persuaded their trainees to enlist in the Army Air Corps, but they recruited many young men for the program. Then, in June, 1942, it was announced that only those men who failed to pass the examination for the Army Air Corps Enlisted Reserve Corps were eligible for Civilian Pilot Training. Angry parents descended on the colleges for their part in the "press gang" tactics. This was the period of expansion of the Army, and it was inevitable that plans had to be changed frequently and quickly without regard to their effect on individuals. The colleges began to realize that "there was a war on"; and after a period of adjustment they settled down to fight.

9. *The War Training Service Period.* In July, 1942, the Civilian Pilot Training Program became the War Training Service. Many colleges coöperated in the War Training Service program, and for one year the program ran smoothly, training more than 100,000 pilots.

10. *The Training Detachment Period.* In July, 1943, the Army Air Corps took over the supervision of the Army War Training Service programs, sending to the colleges detachments of officers and enlisted men—sometimes a staff of from three to seven men being assigned to do the work formerly handled by one man under civilian supervision. This period was a hectic one for the colleges because of the resultant additional costs.

11. *January 15, 1944.* On this date, without previous notice, all Army War Training Service programs were terminated. Teachers had to be discharged without notice; and, in general, the colleges, the teachers, and the trainees were the victims of the new sudden change in policy.

During the War Training Service Period, many programs had been operated for the Navy. The Navy, in contrast to the Army, gave several months' notice prior to the termination of their programs this summer.

WHAT do these experiences of one school suggest as to the ultimate status of flight training in the junior college? The following paragraphs summarizing the past, present, and future of junior college aviation give the author's answer to this question.

The Past. The Civilian Pilot Training Program gave training to 108,345 different individuals, thousands of whom were among the first military pilots to see active service, and thousands of whom served as flight instructors. Many of these CPT pilots are now heroes and high-ranking officers in the Air Corps. The results show that the colleges were right in devoting their energies to the training of pilots. It was worth-while.

During the period of the War Training Service, the colleges trained 289,463 individuals in the United States, making available to the armed services their experience and facilities at a time when the armed services were building their own.

The cost of instruction under CPT was $15.46 per hour of flight. It rose to $29.66 per hour of flight under the WTS.[1] The colleges demonstrated that they could give flight instruction economically. This fact will be important in the future when pilots must be trained

[1] These figures are taken from the Wartime Letter No. 37, published by the American Association of Junior Colleges. They were made public originally at the hearing on the Civilian Pilot Training Act which was conducted at Washington in June, 1944.

and money ceases to flow as freely as in the past.

The Present. Civilian pilot training in the United States has practically ceased. Flight operators, flight instructors, and ground-school instructors have scattered to the winds. One of the casualties of war is the whole Civilian Pilot Training Program, which must inevitably play such an important part in the winning of peace.

The Civilian Pilot Training Act of 1939 has been extended by Congress for two years, but no appropriation has yet been made to make possible the carrying out of its provisions.

The junior colleges in California could not participate at this time in a Civilian Pilot Training Program if such a program were available because of limitations which still remain on civilian flying.

The present time is a period of recuperation. While the colleges are hoping that the negotiation of contracts for the programs closed January 15 will, at least, enable them to break even, they have time now to think and to ask themselves the following questions: Is there a need for a Civilian Pilot Training Program in California before the termination of the war? In the light of past experiences, should California junior colleges enter into any future Civilian Pilot Training Program? Should Civilian Pilot Training be administered through the State Department of Education?

The Future. The development of a great aviation industry after the war and its consequent contribution to the solution of the problem of unemployment can be accelerated by a nation-wide Civilian Pilot Training Program which should be handled by educational institutions rather than by private schools, a separate government agency, or a quasi-military organization such as the Civil Air Patrol—the Civil Air Patrol is an organization approved by the Army Air Corps, which, if we are to believe what we read in the newspapers, plans to increase its activities after the war.

It is time now to raise the question concerning what government agency is to sponsor Civilian Pilot Training after the war. The experience of the colleges as outlined in the first portion of this article indicates that supervision of civilian flight training by the Civil Aeronautics Administration would be very much preferred to control of Civilian Pilot Training by the Army Air Corps under the name of the Civil Air Patrol, the War Training Service, or any other name. The Army Air Corps should explain just what it conceives to be the present and future functions of the Civil Air Patrol in order to clarify the present situation.

The author suggests that Civilian Pilot Training should be continued after the war, with Federal aid administered by the Civil Aeronautics Administration in coöperation with the state departments of education in order to stimulate the rapid expansion of a peace-time aviation industry, not only as a means of solving the unemployment problem and building national prosperity, but as a means of maintaining the world's greatest aviation industry at the least cost as a means of national defense.

The author suggests also that all teachers of America will have to be air-conditioned as the first step in educating our youth for the Air Age. This first step should be taken at once, and all of the resources of educational institutions and of the Civil Aeronautics Administration should be devoted to this end for the duration, thus making it possible to conserve and develop our past and present experience and organization as a preparation for peace-time expansion.

The Contribution of Adult Schools to Aviation

By F. M. YOCKEY

THE importance of aviation education, which has been accentuated by the war, has been recognized for a long time by many of our adult schools. The Frank Wiggins Trade Evening School in Los Angeles has been giving classes in aviation for adults for fifteen years. Long Beach reports that classes in this subject were organized there in 1933.

In order to reveal what has been and is being done in the state, 100 letters were sent recently to schools of all sizes and types. Every size of community from the district in the rural area to the metropolitan centers were sampled. Replies were received from evening high schools, evening junior colleges, special day and evening classes, and from the Extension Division of the University of California. The principal was asked three questions: (1) What are you doing and what have you done in the past in aviation education? (2) What do you expect to do? (3) What could be done if you had sufficient funds and facilities?

TO list classes by titles does not always indicate the content of the course, but it gives some idea of the subject-matter to be covered. In the tabulation of lists which follow, titles which indicate similar content have been included under a single heading even though their wording was not always identical.

The following tables will show what has been done in the sixty schools answering the questionnaire.

Courses in Aviation Education listed by five or more schools are the following:

Subject	*Before 1943*	*In 1943*	*In 1944*
Radio Code	8	11	22
Meteorology	7	9	17
Aircraft Sheet Metal	8	5	8
Radio Fundamentals	6	8	22
Aircraft Welding	7	6	15
Special Mathematics for Aviation	7	7	21
Refresh Course for Aviation Cadets	7	7	7
Aircraft Engine Repair and Maintenance	8	7	16
Aircraft Machine Shop	....	....	6
Aircraft Basic Design and Drafting	....	....	5
Civil Air Patrol Class	....	....	5
Aerial Navigation	7	10	13
Aircraft Mechanics	5	....	....
Total	70	70	157

Two courses—Aircraft Mechanics and Engines and Aircraft Maintenance and Repair—are old stand-bys. The former has been given at Frank Wiggins Trade Evening School for fifteen years, and the latter was started at the Trade Extension Evening High School in Long Beach in 1933.

The following courses were listed by fewer than five schools and were given before 1943, in 1943, and in 1944:

Ground School
Engine Overhaul and Maintenance
Aircraft Instruments
Aircraft Instruments Repair
Aircraft Blueprint Reading
Civil Air Regulation
General Electricity
Aircraft Identification
Theories of Airplane Engines

The following courses were given before 1944, but have not been given in 1944:

Aircraft Machine Shop
Aircraft Basic Design and Drafting

An analysis of the present status of aeronautics in California secondary schools and an evaluation of progress to date would not be complete without a report from the adult schools. Accordingly, Dr. Yockey queried a representative list of adult schools in the state as to their present activities, their future plans, and the ultimate possibilities. He reports his findings in the accompanying article.

The author, an associate editor of the "Journal," is principal of the Oakland Technical Evening High School. He is the adult education representative on the state superintendent's Advisory Council and also is a member of the Executive Board of the California Adult School Administrators Association. Dr. Yockey has taught summer session classes in the principles and methods of teaching adults at the University of Utah and at Armstrong College. His earlier experience includes superintendencies at Alexandria, Minnesota, and Knoxville, Iowa, and principalships in the Knoxville (Iowa) High School and in the Carroll (Iowa) High School.

Aircraft Wood Work
Lofting
Propellors
Mock-up Hydraulics and Plumbing
Fabrics
Painting and Doping
Civil Air Regulations
Production Methods
Production Management
Industrial Management
Aircraft Leadership Training
Aircraft Parachute and Canvas Work
Stress Analysis and Template Development
Aircraft Rigging
Materials and Processes
Flow Bench Operation
Magnaflux Operation
Production Training
Sheet Metal Hand Forming
Radio Telephone Practice
Pattern Making
Template Development
Civil Pilot Training School
Machine Tool Operation

The following classes were given for the first time in 1944:

Carburetion and Ignition
Aircraft Tool and Die
Aeronautics
Aircraft Stenography
Training and Production Illustration
Trade Extension Trade Drawing
Trade Extension Electric Drawing
Factory War Production Training
First Aid for Civil Air Patrol
Radial and Inline Motors
Eddy Test
Aircraft Mechanical Drawing

THE wide variety of subjects listed in these tables shows an alertness to the needs of the community on the part of evening schools. The most extensive programs were in the manufacturing centers of the aircraft industry—Burbank, Los Angeles, and Long Beach—where a greater variety of classes is offered than in other sections of the state.

In some of the smaller cities and rural sections, the principal states that funds can be used to better advantage in fields more closely connected with the major interest of the community. For example, Wesley Pugh of the Modesto Evening Junior College writes: "We feel that our money is more wisely spent in classes pertaining to agriculture. We will concentrate on that angle." Warren E. Gravestock of Centerville says: "Our community is essentially a rural one and our War Production classes are making a real contribution to the needs of this area in a class entitled Making and Repairing of Farm Machinery."

Miss Irene Hofmeister reports for the University Extension, Berkeley: "University Extension, as you know, in collaboration with the Civil Aeronautics Administration provides complete ground school and flight training for pilots working toward the primary and restricted secondary commercial certificates. This work began in 1939 and concluded in 1941, when flight

training on the Pacific Coast had to be abandoned because of emergency war conditions. Ground school training for pilots (review of essential mathematics and physics, navigation, civil aeronautics, meteorology, and general service of aircraft), however, was continued, as were such courses as Meteorology, Principles of Marine and Air Navigation, Celestial Navigation, and Practical Astronomy for Navigators. Courses planned primarily for teachers in secondary schools were offered also—Aviation Education: Ground School Training, and Aviation: Teaching Methods and Materials."

IN answer to Question 2, "What Do You Expect to Do?" such replies were received as the following:

Clayton B. Westover of Glendale Evening High School says, "Our plans are to meet the need of the aircraft industry in this area." This sentiment is typical of the entire state, each school planning to meet the needs of aviation education for its community. Most schools have specific plans for expanding their offerings, only three principals stating that they do not have any plans in this field for the future.

John George Miller of the Frank Wiggins Trade Evening School states: "Our Board of Education is establishing an aircraft department as a unit branch of this school. It will be adjacent to the Los Angeles City Airport, where we have the ground and part of the buildings—five acres. It will be complete in all details for both day and evening training." Scovel S. Mayo of the Sequoia Evening High School shows what can be done in the smaller communities. He says: "We have $7,500 worth of airplane engines for day school pupils. We will use these also for our adult school next year. We also have one trainer plane, for ground work only. We plan to offer a course in Navigation, Radio, and Engine Repair Maintenance in our adult school next year."

J. Everett Hollingsworth of the Long Beach Trade Extension and War Production training program reports: "The future evening program will, in all probability, include Factory Fabrication Trades, Engineering and Tooling, Airplane and Aircraft Engine Maintenance and Repair, Aircraft Instrument Service and Repair, and Aeroplane Radio Repair and Service. In the flight program we visualize a ground school program as a regular offering in the Adult Education Department and Junior College trade preparatory fields. Our greatest problem will be the securing of adequate housing and proper tooling." John Carpenter, director of the Sacramento Adult Junior College, states: "We have just received a new plane from Dayton, Ohio, to keep our instruction up to the minute."

Miss Hofmeister of the University of California Extension Division writes: "Our current offerings in the technical field include, with classes in ground school training for pilots (review of essential mathematics and physics, navigation, civil aeronautics, meteorology, and general service of aircraft), Fundamentals of Celestial Navigation and Practical Astronomy for Navigators. To these have been added new courses of commercial interest, such as an Introduction to Air Transportation, Orientation for Airline Employees, International Airline Freight and Cargo Management, and Airline Passenger Relations and Services. Airplane and Airport Development was one of a series of ten lectures on postwar planning. Correspondence instruction (courses by mail) makes available at all times courses in Aeronautics, Aerodynamics, Meteorology, and Air Navigation and has in preparation a course in Aircraft Design Sketching."

These are typical of the reports from

the various parts of the state on plans for the future.

QUESTION 3 asked: "What could be done if you had sufficient funds and facilities?" Answers to this question were furnished by less than half of the schools; however, the replies received are significant and express hopes that, for the most part, are not too difficult of fulfillment.

George Trout, principal of the Burbank Evening School, states: "If we could get the housing and equipment necessary to qualify for an approved CAA school, we should like to offer IBM operation classes. We would have a complete audio-visual aids library and enough money to buy new aids as they become available. We would improve our photography laboratory and our radio laboratory."

Paul T. Lockhart of the Riverside Evening High School and Junior College has ambitions as follows: "It has already been recommended that as soon as possible we, at our high school and junior college, be provided with an additional shop wherein we could hold a number of classes pertaining to aviation education." Thorwald Krogh, principal of the Monterey Adult School, is interested in working with gliders, being located in an excellent place for such a project. He states: "If sufficient funds were available, there would be no difficulty in getting interest as soon as the proper facilities were made available. Men and women alike would enjoy work with gliders."

SINCE one of the fundamental principles of adult educators is to keep their program flexible and up to date, the concern of administrators in this field has been to meet the immediate needs of men and women. While credit toward high school graduation is granted in many adult classes, only a small minority of students are interested in credit—the greatest number already have graduated from a formal school and are enrolled in the adult school for the information they receive, their reward coming in greater efficiency on the job. Because most adult students are not interested in credit, a greater variety of offerings is possible than would be the case otherwise. Classes can be organized at almost any time of day or evening and can be started on short notice.

Short unit classes which meet once or twice a week for six, eight, ten, or, in fact, any number of weeks, are given frequently and have proved popular. As the need develops, classes can be added to meet new situations, and likewise classes can be dropped when they have served their purpose. During the war, many classes for adults have been offered which will not be needed after the emergency.

This flexibility which characterizes adult education is particularly important in an area such as aviation. It enables education to keep up to date with technical and operational advances. It guarantees that education shall keep tuned to the needs of the moment and thus, by not perpetuating existing offerings, render the greatest possible service to the development of aviation.

For example, in 1940 and 1941 when the Army decided to give examinations to candidates for Aviation Cadet Training in lieu of two years of college, many young men could not pass the tests. As a result, refresher courses were organized by many adult schools to help these young men in subjects which would be of assistance. During 1941, 1942, and the first half of 1943, these refresher classes were filled to capacity. In the fall of 1943, the attendance began to taper off and by April of 1944 only a few classes were still in existence, all these having small enrollments. The need had been met, and the adult school administrators were turning their attention to new fields.

University Contributions to Aviation

By BALDWIN M. WOODS

To complete the picture of the new demands which the air age is making on all levels of education, this article by Dr. Woods is included. In terms of the functions of a university, it discusses certain contributions which institutions of higher learning can make to the future of aeronautics.

The author of this article is director of University Extension and professor of mechanical engineering, University of California. His interest in and connection with aviation have dated back to the days of World War I, during which time he was president of the Academic Board, School of Military Aeronautics, University of California, and director of two other military schools, one for radio electricians. Dr. Woods is well known for his activities in many fields, but there has hardly been a time during the past twenty-five years when he was not connected with aviation in some manner. For example, he gave the first graduate course in aerodynamics at the University, in the spring of 1916, and inaugurated instruction in aeronautical engineering instruction on the Berkeley campus. He is a founder-member of the Institute of the Aeronautical Sciences and a consultant on aeronautics to the University of Illinois. He is coauthor of the text, "Dynamics of Airplanes and Airplane Structures."

AN examination of the state of American cities in 1940, made in coöperation with the American Society of Planning Officials, showed only partial adjustment of the city to the automobile. Specifically, in 221 cities the tendency of the downtown area to deteriorate in value and activity and of the suburban areas to attract population from the center of the city continues. Although this condition is not caused solely by the problems of the automobile, it is a reflection, in large degree, of difficulties of traffic and of parking. It is a further evidence that the cities of the nation have studied inadequately the problems of circulation and disposition of vehicles and that the construction necessary to relieve troublesome conditions is far behind the current need. Even worse is a general lack of understanding of the problems themselves. Thus, at the end of a quarter-century of general national use of the automobile, we are only now beginning a scientific attack on the problem.

The airplane will add rapidly to the problems already made so prominent by the automobile. It will introduce new challenges of its own. These have been discussed widely, and there are few persons who do not sense them.

For example, under the influence of the automobile the radius of a metropolitan area has increased from three to four miles; the distance a man can travel going to work has increased from the few blocks he could walk to 15 or 20 miles—in a few cases more. Under the influence of the airplane, will it rise to 50, 75, or 100 miles? If so, what will be the correlation between the use of the commuter airplanes and the rapid transit of the cities? Will there be a ring of commuter airports, primarily for the storing of airplanes, these airports serving as important points of the city's rapid transit system?

With 60 per cent of the American population now living in urban communities, and with increasing efficiency in the production of food which indicates additional urban residents, what solutions are promising?

UNIVERSITIES and other agencies of civilization have passed from the age of the cloister to that of the market place. The problems of technological development call for their attention.

The university must accept additional responsibilities with every change of civilization. The airplane promises to be much more than a new mode of transportation. It will affect civilization profoundly, perhaps more profoundly than did the railroad and the automobile.

The different modes of transport have called on university men for assistance in degree largely corresponding to the state of college training in the country at the time. The development of the railroads came when college training was relatively uncommon. The number of professionally trained engineers and business administrators used by the railroads is still small. The automobile used university facilities to a much greater degree. It has been the airplane, however, which has placed the greatest demand on college training. At the beginning of the war, the aviation industry was largely in the hands of young college graduates. Most of them were young engineering graduates, but there was a generous sprinkling of business administration college men among them. There are quite notable exceptions, but the trend toward the use of higher training by aviation is quite evident.

UNIVERSITIES now are sensing their responsibilities with reference to the automobile. They recognize that it is not merely the training of technicians to design and improve automobiles that concerns them. The problems of traffic development and control, of highway construction, of city planning, of zoning, are all in the picture.

What should their program embody to meet the needs of aviation? This requires careful analysis of the problem, based on a recognition of the functions of the university.

The university program embodies teaching, research, and service. All of these are important, and each should receive its proper emphasis.

In the field of professional training, the university is almost an exclusive agency. The past generation has seen the general adoption of high school training for the youth of the country. The next generation will see a great extension in professional training.

In the field of research, a university's efforts are supplemented by those of industrial and business organizations, as well as by numerous government agencies. The quality and spirit of university research should be the best. In basic research, it is the leader of today—although in quantity of output, it may take second place to other agencies, both private and public. With increasing complexity and cost, research will require more teamwork, more organization, more coöperation among agencies, and larger outside support.

Universities have been organized in increasing degree for service to the public, to government, and to industry. It should be mentioned that university extension services, including those in agriculture and engineering, furnish the background of knowledge and experience on which service may be developed to meet many of the needs of aviation. The remainder of this article will be devoted to an analysis of the contribution which universities can make to the aviation industry in the areas of training and research.

UNIVERSITY training for aviation in the past has been largely the training of aeronautical engineers. Now that the airplane has become more complex and its production is in quantity instead of individual, hand-made single airplanes, the type and number of engineers needed has changed materially.

Of those highly trained as aerodynamicists and structural engineers, the industry needs a few, but not a great number. In certain airplane manufacturing companies employing large staffs of engineers today, only about 10 per cent of these employees fall in the group having this specialized training. The others are mechanical engineers, acquainted with machines, power, and production problems; electrical engineers versed in the development of electric power and communication, well informed in electronics; engineers knowing the problems of hydraulic controls and systems; industrial engineers; and metallurgical engineers.

The university, which trains engineers in the basic principles of mechanical, electrical, civil, and metallurgical engineering, will be able to supply a large fraction of the needs for the men who enter the field of aeronautics. Obviously, some orientation with the problems of the industry is required, and this will call for some special courses. The curricula for aerodynamicists and structural engineers are more specialized and will require more in the way of special staff and facilities. But aviation has come of age and uses all types of engineers just as do other forms of transportation.

The largest change likely to take place in the next decade is the shift of emphasis from the technical problems of design and production to the problems of business management. The use of the airplane for transportation will call for large numbers of men having superior training in business administration. Before the war it was common for a single airplane in air transport use to develop enough business to support about fifty employees of the company. A seat in an airplane would bring in more than $20,000 per year revenue. The development of air routes is largely a question of securing business adequate to maintain them as an enterprise. Management and supply problems will be of first importance. Graduates in business administration, especially acquainted with the problems of air transport as well as the problems of manufacturing, are already in demand.

There is a small but growing demand for men trained in aviation law. Legal problems connected with air transport, whether commercial transport or private flyer, are numerous. The licensing of aircraft, the questions of jurisdiction of local, state, and national agencies, and the duties of flight personnel are involved.

In the field of shipping, admiralty law has developed through the years into a very sizeable body of principle and application. The legal regulations and adjustments concerned with public carriers, like the railways and bus transportation systems, have become numerous and complex. The airplane flies over many countries and boundaries in a short time and frequently in a single flight. The captains of airplanes flying the Pacific, for example, have assumed legal powers comparable with those of ship captains. A new body of law is already in existence and is growing rapidly. The need for men adequately trained generally in the law and specifically in this area will increase rapidly.

Medical schools will need to train flight surgeons for use by commercial airlines, government agencies, and other organizations. The specialization of this training is already recognized. A broader training problem is the inclusion in the medical curriculum of ma-

terial dealing with the effect of changing atmospheric pressures on persons with different disabilities. Knowledge of the effect of flight on persons variously afflicted is inadequate at best, and physicians should be acquainted with what is known as rapidly as it is available.

Another training problem which may be of interest to some medical schools is that of training hostesses. Up to the present time, many airlines have preferred to use graduate nurses. In most cases a specific knowledge of nursing is not a primary requirement; however, the professional outlook of these young women is of major importance in their work. Some medical school directors incline to the view, therefore, that a few schools might devise a specialized course for training hostesses which would give less emphasis to the nursing requirement and broader emphasis to the public health and comfort problems associated with the operation of aircraft.

RESEARCH activities of the universities will be of comparable importance to those in the area of training. They will be needed in all of the fields for which training already has been suggested and in many others.

There is a disposition in universities to limit the word "research" to the investigation of broad principles having many applications. In industry the emphasis is likely to be on the applied rather than on the fundamental side. In aviation, however, both types of research are of the utmost importance. It is essential to know the laws of airflow in order to apply them. Work must be done at both ends of the job. The workers in the professional schools will be interested in making useful the principles developed by engineering scientists, physicists, and others.

Applied research is more and more a collaborative undertaking. Many research projects will be prosecuted on the campus, but many others will require the use of facilities of the airplane manufacturer or the airline operator in order to give satisfactory results. For example, conclusions concerning physiological effects of high altitudes reached in low-pressure chambers of a medical laboratory require verification in flight tests. As time goes on, therefore, we may expect research, like training, to be conducted both on the campus and off the campus.

One field requiring study by both the school of business administration and the college of engineering is that of aviation economy. The speed of development of aircraft makes it desirable to know in advance how a venture should be made to give prospect of eventual business and engineering success. Harmony between the business and engineering requirements is required. The design of an airplane for trans-Pacific flight must be studied with reference to the business, economy, and supply problem to be encountered; therefore, an economy study is indicated. One major airline operates a division of economic research for the special purpose of harmonizing these elements. Basic studies with reference to airports as well as airplanes are needed from the universities.

Most interesting of the aspects of aviation is the variety of its problems. Virtually every department of the university will find research projects in its own field which are important because of aeronautics. Psychologists, physiologists, historians, economists, physicists, chemists, engineers, all will find challenging problems. The university student will find the old courses flavored with applications from aeronautics.

Aeronautics is a new mode of life. What we shall do with it depends on our vision of planning and our institutions. The university can lead in making the airplane safe for civilization.

Research and the Teaching Of Aeronautics

By CORNELIUS H. SIEMENS

Supplementing the symposium reports of evaluative studies in California schools is this summary of important research studies, published elsewhere, which throws further light on many of the problems discussed in earlier articles of the symposium.

Dr. Siemens, who writes the article, has been one of the outstanding leaders in the development of secondary school aeronautics in California. He is an assistant professor of education at the University of California and for several years has assisted with various CAA activities. For three years he has taught a summer session course at the University entitled Curriculum in Aviation Education. At present he is organizing nine aviation operations institutes to be held at principal airports in the six Western states, sponsored jointly by the CAA and state departments of education. He also is supervising the distribution of surplus aircraft materials for five West Coast naval air stations. Dr. Siemens is the author of the "Aeronautics Workbook," published in 1942 and widely used throughout the country.

MANY secondary schools, even after two years of experience in teaching the science of aeronautics, are asking such questions as "Is physics a necessary prerequisite to aeronautics?" "How much mathematics is needed?" "Should girls study aviation?" and many others. Although much has been written about the need, scope, and importance of aviation education, surprisingly few research studies have been reported. It is the purpose here to summarize briefly those research findings that have a significant bearing on the teaching of aeronautics in the secondary schools, and in particular on the work of the course usually referred to as the "science of aeronautics."

WRINKLE and Glidden[1] studied the achievement of a class of forty-five students enrolled in a one-year course of aeronautics. The criterion of success was the CAA Private Pilot Examination. They concluded that students with one or more years of mathematics show higher achievement generally than do others, but that their greater success can be accounted for in large part by the superior scholastic aptitude of those students who elect courses in mathematics. With the intelligence factor eliminated, it was found that the correlation coefficient representing the relationship between achievement in physics and aeronautics was $-.20$; the highest positive correlation with intelligence held constant existed between achievement in elementary algebra and aeronautics, namely, $+.26$. These data seem to justify the conclusion that "the practice of making the completion of full-year courses in algebra and geometry prerequisite to enrollment in aeronautics classes in the secondary school is unwarranted."

Segel[2] investigated the validity of the

[1] W. L. Wrinkle and H. F. Glidden, "Aeronautics Prerequisites." *The Bulletin of the National Association of Secondary School Principals*, 28:35–43, February, 1944.

[2] David Segel, "Validity of the V. C. Aeronautics Aptitude Test and the O. E. Scientific Test." *Journal of Psychology*, 18:65–80, July, 1944.

Victory Corps Aeronautics Aptitude Test (VCAA Test) devised by the United States Office of Education as a "prognostic test of preflight training and related work in senior high schools." The study concludes that the test has validity for use in guidance work since "it has a substantial amount of power in predicting success in mathematics and science . . . [and] a fair amount of power in predicting success in English." The average raw correlation coefficients between the VCAA Test and mathematics, science, and English are respectively .38, .41, and .34. The study fails, however, to make a comparison of the test results and success in a course in aeronautics, the most practical test of its validity. Segel also assumes, fallaciously, that success in "pre-aeronautical courses at the upper or engineering level of aeronautics" is the aptitude necessary for pilots, navigators, and bombardiers.

In May, 1944, Johnson[3] canvassed 125 representative high schools throughout California for the purpose of gathering information as to the nature of the offerings, curricular adjustments, and opinions as to what should be the future of aviation education in the secondary schools. Of the 100 replying, 87 per cent of the small schools, 93 per cent of the medium schools, and 96 per cent of the large schools indicated they are offering work in aeronautics either in specific courses or in connection with other courses. It was found that 59 per cent of the small, 74 per cent of the medium, and 87 per cent of the large schools reporting are giving specific courses in aeronautics.

Johnson reports that principals indicate the following as problems: (*a*) that the college preparatory course does not allow students to take aeronautics in addition to prescribed science courses, (*b*) a reluctance to modify regular courses to include aspects of aeronautics, (*c*) the need for convincing parents of the value of studying aeronautics, and (*d*) the conflicting reports from military authorities as to the value, scope, and need of aeronautics in the high schools. Fifty-four per cent of the schools replying plan to offer aeronautics permanently, and an additional 23 per cent will continue to offer it if it is needed or demanded.[4]

THE most extensive study to date of aeronautics teaching in the secondary schools was completed recently by the American Council on Education.[5] The analysis was prepared for and in coöperation with the Civil Aeronautics Administration, using as the one standardized criterion of achievement in aeronautics as taught in the secondary schools the regular Civil Aeronautics Administration Private Pilot Examination, also known as the CAA Examinations on Aeronautical Knowledge. This test, it should be mentioned, consists of four sections of thirty multiple-choice questions each, these divisions being (1) Civil Air Regulations, (2) Navigation, (3) Meteorology, and (4) General Servicing and Operation of Aircraft.[6]

Using the scores obtained on the CAA Examinations and other information gathered about the schools, teachers, and students as the basic data,

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[3] L. W. Johnson, "Aviation Education in the Secondary Schools of California." *Butte County School Bulletin*, p. 7–8, June, 1944.

[4] For a more complete report of this study, refer to the "What's Happening in California Secondary Schools" column of this issue of the JOURNAL, p. 327-329.

[5] *A Study of Aeronautics Courses in the Secondary Schools.* The American Council on Education, Washington, D. C., 1944.

[6] For a description of the content and study materials see *Pilot Written Examination Guidebook*, United States Department of Commerce, Washington, D. C. (can be obtained free from the U. S. Government Printing Office), July, 1943. Objective tests covering the same area have been made available also by the American Council on Education: *Coöperative Pre-Flight Aeronautics Tests* (five tests, by units), Coöperative Test Service, 15 Amsterdam Avenue, New York City, 1943.

the American Council on Education made a study of a representative group of over 3,000 students from 470 schools, selected so as to furnish a wide geographical distribution and a great variation of students, size of school, and background of teacher. As a result, many of the questions regarding length of course, prerequisites, and teacher training now have a statistical basis for answers.

The conclusions from this study having a direct bearing on the improvement of the teaching of aeronautics are given below. Differences among attained average scores are spoken of as "significant," "favorable," or "insignificant" on the basis of the commonly accepted statistical interpretation of the critical ratios—although the critical ratios are not given in the original report, they are readily calculable from the data. Also, unless otherwise noted, the difference between the average IQ of any two groups under comparison was found to be statistically insignificant.

1. The students whose teachers had taken a special course in aeronautics made significantly better scores on the CAA test than those students whose teachers had not taken such a course.

2. Teachers of aeronautics whose major teaching fields are either science or mathematics are more effective teachers of aeronautics than teachers from other fields, in so far as CAA Pilot Examination test scores are a criterion of achievement. The difference noted, however, does not warrant the exclusion, as teachers of aeronautics, of all those whose teaching fields are other than mathematics or science.

3. In general, students in the very small schools do not do as well on the CAA examinations as those enrolled in larger schools. It is interesting to note, however, that an insignificant difference exists between the average score made by students from schools enrolling between 100 and 200 and by those from schools with enrollments of 2,000 to 2,500. The highest CAA test average was achieved by schools in the 800-1,000 enrollment category.

4. The aeronautics course is most commonly taught as a full-year course, carrying credit toward high school graduation. About five per cent of the

During recent months, the "Journal" has published a number of important articles covering various phases of aeronautics teaching in the secondary schools of California. Added to the current symposium, they make an important contribution to the literature of aviation instruction.

In May, 1944, appeared an article by Dr. Cornelius H. Siemens entitled "Developments in Aviation Education" (19:259-265). An earlier article by Dr. Siemens, who planned the current symposium, also appeared in the May, 1943, issue under the title of "Mathematics of Preflight Aeronautics" (18:270-274).

Signalling the advent of secondary school aeronautics as a part of the curriculum was a symposium in the January, 1943, "Journal" (18:9-40). Entitled "Preflight Training in California Schools," this series of articles was widely circulated throughout the country.

Representing a specialized sort of secondary school aviation was an article by Philip M. Ferguson, "Preparation for Aviation Cadet Training," which was published in the December, 1942, magazine (17:469-471).

Issues of the "Journal" containing these articles can be obtained from Haviland Hall, Berkeley, California. Individual copies sell for 50 cents each, but ten or more copies of one or more of these issues may be had at the reduced rate of 35 cents, provided they are to be mailed to a single address.

schools offer the course for only one semester.

5. Aeronautics has been primarily a junior and senior year course. Of the group studied, only 2 per cent were students in the tenth grade, and 71 per cent were in the twelfth grade.

The twelfth-grade students did slightly better on the CAA Pilot Examination than the eleventh-grade group, but the difference is statistically insignificant.

6. Approximately ten per cent of the students enrolled in the aeronautics classes studied were girls. The average IQ of the boys was 108.8, whereas the girls had an IQ average of 111.2. A negligible difference was found between the average scores made by boys and those made by girls in the Civil Air Regulations and Meteorology sections of the CAA Examination. In Navigation and General Service and Operation of Aircraft the boys scored significantly better than the girls, even though the girls had a higher average in intelligence. This should not be interpreted to mean that girls cannot succeed in the course or in the CAA Examination. It simply confirms other studies which show boys to be superior to girls in subjects that include science and mathematics.

7. An analysis of the prerequisites which over 1,000 schools have set up for a course in aeronautics shows that two-thirds of the schools require that students be at least juniors before enrolling. Twenty-two per cent of them allow only seniors to enroll.

Over one-third of the schools studied require no previous course in science or mathematics; two-thirds require no course in science, whereas two-fifths require no course in mathematics. About one-sixth of the schools require a combination of two years of mathematics and one year of science; all other combination requirements include but 13 per cent of the schools studied.

8. Evidence does not warrant the requiring of physics as a prerequisite to the high school course in aeronautics. The difference in favor of those students having had physics over those who have not is no greater than the difference in IQ favoring the group having had physics.

A separate study was made of 205 pairs of students matched on the basis of chronological age, IQ, grade in school, average school grades, and the amount of mathematics background. Both members of a pair were selected from the same school. On the test as a whole, the group having taken physics, but equivalent in other respects, made slightly better scores on the CAA Examination—the difference being insignificant, however. Only in one portion, namely, Navigation, does the difference approach significance—navigation, strangely enough, being one of the areas of aeronautics inherently least related to physics. This study confirms the conclusion that physics need not be considered a prerequisite course to aeronautics.

In general, the higher scores made on the CAA Examination by those who have taken physics result from the superior intelligence of that group.

9. The effect that having taken a course in algebra has on achievement in the CAA Examination is negligible when intelligence is held constant. This same result was found to be true for geometry and trigonometry.

Negro High School Population Grows

The Negro population of the country is now one and a half times what it was in 1900; but the Negro high-school population is 40 times the 1900 figure.

A Program for Improving Aviation Teaching

By F. W. HART

Fittingly, this symposium analyzing the place of aeronautics in the school curriculum and evaluating the program which has developed to date closes with an article outlining a program for improving the teaching of aviation. The program as described in the article by Professor Hart makes provision for the training of teachers enrolled in college and university classes and for assistance to teachers in service. It is based on the idea that the greatest problem confronting teachers interested in aviation is that of learning enough about aeronautics to guide and direct the interest of their students.

The author of this article is a professor of education at the University of California, Berkeley. For several years he has been identified with the effort to air-condition the schools of America, serving as an educational consultant for the CAA and traveling throughout the country to spread the gospel of the air-age.

INTEREST long has been recognized by teachers of children, youth, and adults as the most potent conditioning factor of learning—little interest, little learning; no interest, no learning. Interest provides the drive that leads to mastery despite obstacles otherwise insuperable.

Modern methods of teaching seek to challenge the interest of students in all grades and all subjects, but experience bears abundant and conclusive testimony that many subjects held to be an essential part of organized education have failed to challenge the driving interest of far too many of our young people.

Up to now, no single universal challenge to the imagination and interest of school children and youth has cast the gleam of its glistening wings into every classroom in the Nation, but today the airplane has done just that. But young America today is "on the beam." Young America, boys and girls alike, stands ready and anxious to master whatever knowledge will contribute to its effective participation in the age of flight.

THE problem of teachers, therefore, is not one of creating interest on the part of students in the subjects they teach, but rather of ways and means of associating the subject-matter of their teaching with youth's driving interest in aviation. In this connection it may be said with certainty that there is no activity in the curriculum, from kindergarten to college, that cannot be "sparked" in the pupil's mind if he sees in it an association with aviation. Through such association, teachers not only can teach more effectively what they have long been trying to teach, but at the same time they can contribute greatly to citizenship training for a world of three dimensions.

The problem confronting teachers, in general, is one of learning enough about aviation to guide and direct the absorbing interest of children and youth into useful and constructive channels. In recognition of this problem, Aviation Education Service of the Civil Aeronautics Administration, Department of Commerce, seeks to assist state departments of education, local school systems, teachers' colleges, universities, and extension divisions in making available to

all teachers of all subjects, in all grades, appropriate information and experience that will aid them in guiding and focusing the air-mindedness of youth to useful ends.

Through such aid it is hoped that the social, political, and economic implications of the airplane will be woven into all the subjects of the current curriculum and that the science of aeronautics, as an added subject, will find its place in the program of students in the last two years of high school.

OUTLINED below is a suggested program for the improvement of aviation teaching on all levels in all schools. It is based on the recommendations of a committee representing (1) state and local education authorities, (2) colleges and universities engaged in teacher training, and (3) Aviation Education Service of the Civil Aeronautics Administration.

This suggested program of teacher training in aviation education recognizes three agencies to which teachers may turn. The services which each of these may render are outlined in brief as suggestions only. The field is new and wide; areas are open for the exercise of initiation and for pioneering activities.

A. STATE-LOCAL EDUCATIONAL AUTHORITIES

A-1. *Supervision of Aviation Education in the Schools.* A director of secondary education or a person with that responsibility is commonly a member of the staff of a state department of education. Aviation education usually is one of his duties. With the rapid growth of aviation education in the schools, it may be desirable that the supervision of aviation education be the total responsibility of one member of the state department, whose function would be the supervision of aviation education in all grades of the school program. A number of states, including Illinois, Wisconsin, and California, have published special bulletins on aviation education.

A-2. *Certification of Teachers of Aeronautics.* Some states which certify teachers of specific subjects recognize aeronautics as a special certification field.

A-3. *Recognition of Aeronautics Course Credit and Status.* Credit for the study of aeronautics in the secondary school is general, and the status of aeronautics courses generally is very favorable. The recognition of aeronautics credit as meeting science credit requirements should be encouraged.

A-4. *Coöperation with Teacher Education Institutions in the Programs for Aviation Education.* It is, of course, desirable for state and local educational authorities to take the initiative in pointing out to teachers' colleges and universities the needs of the schools for qualified teachers of aeronautics, as well as the need for infiltrating relevant aviation material into the regular subject-matter fields.

A-5. *Organization of Aviation Education Teachers Sections of State and Regional Teachers' Associations.* The organization of aeronautics and aviation education teachers for purposes of planning state and regional programs in connection with teacher association conventions and conferences has been encouraged in many states.

A-6. *Establishment of Aviation Teacher Conferences, Clinics, and Study Groups.* Much of the most effective activity in the stimulation and servicing of aeronautics education and teachers of aeronautics has resulted from conferences and clinics which have been initiated by state and local authorities.

A-7. *Library Materials, Visual Aids, and Equipment Exhibits.* It would be desirable if each state department of education should set up an aeronautics library and laboratory in which teachers of the state would have access to available materials and equipment.

A-8. *Distribution of Announcements and Materials.* Wherever possible, materials for teachers of aeronautics and aviation education should be distributed through the services of the state department of education. In turn, teachers of aeronautics and aviation education should look to the state department for assistance.

B. COLLEGES AND UNIVERSITIES ENGAGED IN EDUCATING TEACHERS[1]

TEACHERS OF AERONAUTICS

B-1. *Summer Session: A Course in Aeronautics for Secondary School Teachers.* A course in aeronautics for secondary school

[1] Institutions and agencies responsible for the training or supervision of teachers will find helpful a bulletin entitled "A Suggested Program of Teacher Training," which can be secured from the Aviation Education Service, Department of Commerce, Washington, D. C.

teachers is advisable. This course should make provision for the teaching of the content included in the secondary school aeronautics course as well as providing a study of materials and methods of teaching.

B-2. *Regular Year Course: Aeronautics for Secondary School Teachers.* During the regular school year this course, instead of being taught within the period of one quarter or semester, might be made a continuous one-year course.

B-3. *Specialized Advanced Courses in Aeronautics and Related Fields.* Courses such as communications, economics of air transportation, advanced navigation, et cetera, may well be offered.

B-4. *Summer Session: A Course on Implications of Aeronautics for Everyday Living.* A valuable course for teachers of aeronautics and all other teachers would be one which considers the implications of aviation for everyday living. This course would be concerned with the implications of aviation for international relations, commerce, health, community life, et cetera.

B-5. *Introduction of Aviation Content Into Many Courses.*

B-6. *General Courses for Majors in Related Fields.* It would be desirable and of interest to many teachers if colleges would set up courses for teachers majoring in fields other than aviation. For example, social studies teachers would be interested in courses on the impact of aviation on international relations, or the social and economic implications of aviation. Science teachers would be interested in a course in recent scientific developments in which aviation would be a major consideration. Similar courses might be set up in other major fields.

B-7. *Extension Courses and Correspondence Study.* For in-service teachers, opportunity should be available for enrollment in extension and correspondence courses, particularly the courses in aeronautics for secondary school teachers. Correspondence study courses in this field have been developed by a number of universities.

B-8. *Salvaged and Surplus Aeronautics Equipment.* Colleges and universities engaged in the education of teachers are eligible to request Army and Navy salvaged surplus equipment which heretofore has been available only to high schools.

B-9. *Operations Institutes and Field Trips.* New experiences which give reality to the study of aeronautics and aviation education make learning more effective. Operations institutes (see C-5) and field trips provide additional opportunities to introduce reality into the study in these fields.

B-10. *Flight Experience.* The testimony of many teachers of aeronautics is that actual flight experience is of great help in giving them full understanding of various aspects of the courses which they are teaching. It would be desirable for all teachers of aeronautics and aviation education to have at least a minimum of flight experience (see C-4 and C-6).

B-11. *Flight Training and Certification.* Flight training which is an extension of flight experience would be even more valuable.

B-12. *Library Materials, Visual Aids, and Equipment Exhibits.* In the teaching of aeronautics a knowledge of available materials, visual aids, and equipment is desirable. Library materials and exhibits should be set up by the college or university.

B-13. *Student Teaching in Secondary School Aeronautics.* Student teaching in aeronautics classes would be valuable experience for prospective teachers of aeronautics.

B-14. *Special Aviation Education Conferences.* Particularly during the summer session, as well as during the regular school year, the planning of special aviation education conferences would be an attractive feature of the program of any teacher education institution. The coöperation of the Aviation Education Service of the Civil Aeronautics Administration is available in the planning of such conferences (see C-9).

SECONDARY SCHOOL TEACHERS OTHER THAN TEACHERS OF AERONAUTICS

B-15. *Summer Session: A Course on the Implications of Aviation for Everyday Living.*

B-16. *Separate Courses in Specialized Fields* (see B-6).

B-17. *Introduction of Aviation Content Into a Great Many Courses* (see B-5).

B-18. *Regular Year Course: Implications of Aviation for Everyday Living* (see B-4).

B-19. *Operations Institutes and Field Trips* (see B-9).

B-20. *Flight Experience* (see B-10).

B-21. *Extension Courses and Correspondence Study* (see B-7).

ELEMENTARY SCHOOL TEACHERS

B-22. *Summer Session: A Course in Aviation Education for Elementary School Teachers.* A complete 98-page syllabus for this course is available now from the Aviation Education Service, Department of Commerce, Washington, D. C., for distribution to college and university teachers.

B-23. *Summer Session: A Course on Implications of Aviation for Everyday Living* (see B-4).

B-24. *Separate Courses in Specialized Fields* (see B-6).

B-25. *Regular Year Course in Aviation Education for Elementary School Teachers* (see B-22).

B-26. *Regular Year Course: Implications of Aviation for Everyday Living* (see B-4).

B-27. *Extension Courses and Correspondence Study* (see B-7).

B-28. *Operations Institutes and Field Trips* (see B-9).

B-29. *Flight Experience* (see B-10).

C. THE AVIATION EDUCATION SERVICE (OF THE CIVIL AERONAUTICS ADMINISTRATION) AND COÖPERATING AGENCIES

C-1. *Preparation and Distribution of Teaching Materials, Bibliographies, et cetera; Coöperation with Authorities and Publishers.* Much material has been prepared and distributed by or for the Aviation Education Service of the Civil Aeronautics Administration. A syllabus is available now for use by college and university instructors in the teaching of a course to elementary school teachers on aviation education in the elementary school.

Also in preparation is an aviation education source book for the elementary and junior high schools.[2] This book will be a source of authentic information, arranged according to grade level, concerning aviation as related to other fields. It will be in the public domain and will be furnished to publishers, textbook writers, the curriculum divisions of state departments of education, colleges, and public schools at cost.

C-2. *The Consultant and Advisory Services for Schools; Provision of Speakers for Special Aviation Education Conferences.* The consultant and advisory services of the Aviation Education Service is available to colleges and universities for assistance in setting up programs for the preparation of teachers and for the improvement of the teaching of aviation education in the schools.

C-3. *Coöperation in Distribution of Salvaged and Surplus Aeronautics Equipment.* As it becomes available, Army and Navy salvaged and surplus aeronautics equipment; consisting of single instruments or wing panels to complete inoperative planes, may be secured by schools and colleges for laboratory and demonstration purposes.

C-4. *Coöperation in Pilot and Instructor Certification of Teachers.* With the recent removal of restrictions, it is now possible for teachers to secure flight training in nonvital defense zones. They may obtain a student pilot's license for this purpose from the Civil Aeronautics Administration. Whenever possible, teachers of aeronautics should be encouraged to have at least some flight experience and, if possible, flight training.

C-5. *Coöperation with CAA Regional Managers and Educational Authorities in Planning Operations Institutes.* Operations institutes are made possible through the cooperation of the Civil Aeronautics Administration field organization and educational institutions.

C-6. *Coöperation with Civil Air Patrol in Securing Flight Experience for Teachers.* Teachers are finding it possible to secure flight experience not only in private flying schools, but also through the coöperation of the Civil Air Patrol.

C-7. *Coöperation with Aircraft Manufacturers and Operators in Arranging Field Trips.* Through coöperation with aircraft manufacturers, visits to aircraft factories and services of aircraft manufacturers' personnel might be available to classes.

C-8. *Demonstration Laboratory of Teaching Materials, Equipment, et cetera.* At the Washington office of the Aviation Education Service, a demonstration laboratory of teaching materials, aviation equipment, teaching aids, films, et cetera has been developed. Reviews of aviation materials are prepared, and the advisory service of the laboratory is available to schools with reference to instructional materials and equipment.

C-9. *Tests.* Through the services of the General Inspection Division of the Civil Aeronautics Administration and in coöperation with various educational organizations, instructional tests and proficiency examinations have been developed and made available to the schools. Teachers and administrators should be acquainted with the materials available through the Coöperative Test Service of the American Council on Education and the CAA examination unit.

C-10. *Research Projects.* Various research projects in aviation education have been set up and conducted by the Aviation Education Service.

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[2] A description of this project is included in the article by R. Will Burnett, entitled "P-38's in the Junior High Curriculum?" which appears earlier in the present symposium.

Coöperation in the Nursery Center

By MILDRED F. EBY

The use of a nursery school as a home economics laboratory offers many opportunities for training in child care and other aspects of homemaking. Through the Lanham Act, which provides funds for the establishment of child care and nursery school programs for the children of working mothers, many cities now have nursery centers which before the war had none; and undoubtedly a number of them will develop cooperative programs of the type described in the accompanying article.

Miss Eby is chairman of the Home Economics Department of the Abraham Lincoln High School, Los Angeles. She reports that for many years the students at Lincoln have had the type of training she describes herein.

THE Los Angeles Schools have been pioneering in training girls for better understanding and care of little children. Several years ago the seventh and eighth grade girls were assigned for certain hours each week to help in day nurseries, and since then high schools have set up courses in child care which include active participation in the nursery centers sponsored by the local board of education.

This program will not function unless both the nursery and home economics teachers have vision and enthusiasm and work in harmony toward the same objectives and understanding. The home economics teacher must have an understanding of the nursery school child, and the nursery teacher must have an understanding of the adolescent.

As the program was worked out in Los Angeles, the interpretation of the nursery school program with its educational implications has been the responsibility of the nursery school teacher, while the organization of the program and the quality of service given by the girls have been the responsibility of the home economics teacher. Both teachers work together in planning the material for use in the classroom.

The following plan of organization, developed in one school, has proved very effective both to the students involved and to the small children in the home economics laboratories.

A CLASS of twenty-eight girls from Lincoln High School is enrolled. Each girl is assigned for a double period, one period of activity at the nursery center and one period in the classroom at the high school. The classroom period is devoted to the study of child development and preparental education; handicrafts which will prove useful in the work with young children also are studied.

The girls are assigned to the center in groups, four girls going each period of the day. After a period of instruction and observation, they assist in preparation of the children's food and serve as cadet teachers in routine and play situations. The duties of the four girls rotate each week so that each girl has experience in all the day's activities.

This course in care and guidance of children, coördinating the classroom instruction with active participation in the nursery center, carries home economics credit. The participation of the

students serves two purposes: first, it provides a learning situation for the high school students and, second, it is a service to the community.

TO show the many and varied activities in which the girls take part, the following schedule for the day at the Gates Street School Nursery Center, where our home economics laboratory is located, is offered:

7:30–9:00 a.m.

Arrival and Health Inspection of Children (our first period starts at 8 a. m.).

Inspection of throat, ears, face, and hands. After admittance the children join play groups.

7:30–10:00 a.m.

(Children are divided into two groups—the younger group up to 2 years old being in one section and the older group of 3- and 4-year-olds being in another.)

Indoor Play—Self chosen activities, with material lending itself to:

1. Dramatic play: Playing house or dolls, "dressing up," playing with transportation toys.
2. Manipulation: Through use of peg boards, puzzles, pounding boards or other manipulation toys, plasticino.
3. Construction: Using building blocks and accessory materials.

Outdoor Play—Each playground is equipped with material lending itself to:

1. Large muscle development and coördination.

Climbing, Swinging, Stretching, Jumping, Balancing	Through use of jungle gym, swings, packing boxes, long boards, flexible jumping boards.
Pushing, Pulling, Lifting, Pedaling	Through use of large hollow blocks, shorter boards, barrels, wagon, and tricycle.

2. Construction—through use of large blocks, sand, packing boxes.
3. Sensory experiences—through use of sand, water, clay.
4. Dramatic play—through use of a playhouse, construction material.
5. Experience with living things—through contact with plants and animals.
6. Creative activities—through use of paint, clay, and all above materials.

9:00–9:10 a.m.

Toilet Routine and Drinking Water—younger group. Object of toilet routine—beginning to learn control of elimination functions, to flush toilet, to wash hands, and to become increasingly independent in managing clothes. A matter of fact attitude is encouraged in all toilet routine.

10:00–10:15 a.m.

Taking of Cod Liver Oil and Fruit Juice.

Children in each group are given one teaspoonful of cod liver oil, one cup of tomato or fruit juice, and one graham cracker. Each child pours his own cup of juice, carries the empty cup to a serving table, wipes his mouth on a paper napkin, and resumes his former activity.

10:15–11:45 a.m.

Quieter Activities—Activities of 7:30–10:00 a. m. period extended to include:

Music, creative and spontaneous.

Stories and books, simple and within the child's experience.

Carpenter work, with hammer and nails, carefully supervised.

11:45–12:05 a.m.

Washing Routine and Rest.

Children are sent from playground to bathroom in groups of four. Toilet routine is followed by washing procedure—each child takes wash cloth from hook identified by his picture pasted above, washes hands and then his face, dries hands and face on paper towels, puts towel in basket and used cloth in basin (to be washed), and proceeds to sleeping room.

Emphasis is placed on habit formation. After washing, the group rests on beds until luncheon is served. Each child is expected to be silent and not bother his neighbors.

12:05–12:30 p.m.

Lunch Period.

Object of lunch routine is the formation of good eating habits, acceptable social behavior, and experience in self service and carrying of dishes. The hot noon meal consists of a protein dish, two or more vegetables, toast, milk, and dessert.

12:35–1:00 p.m.

After-Lunch Routine.

As the children finish lunch, they go to the playground, then are sent in groups of four to bathroom. They remove their shoes, and sometimes their outer clothing, and proceed to the sleeping room.

1:45–2:45 p.m.

Sleep Period.

Each child is expected to be silent and to sleep. Temperature of the room and ventilation are checked, and the length of sleep is recorded on a chart. As children awake, they dress and go to the toilet. Habits of self-help in dressing are encouraged.

2:45–3:15 p.m.

Milk.

After the toilet routine, children go to the milk table. The same procedure is followed as for fruit juice (10:00–10:15).

3:15–5:00 p.m.

Outdoor and Indoor Play—as in the 7:35–11:45 period. (The high school students leave at 3:10 p. m.)

EACH girl assisting in the center grades herself daily, using a check sheet, and having her grades approved by the nursery center teacher. The points included on the sheet are those which fit our needs. They are as follows:

	Per cent
1. Being on time	10
2. Having clean hands and nails	5
3. Listening to directions	10
4. Knowing exactly what to do	10
5. Doing work completely and on time	20
6. Having quiet voice, using fitting and correct English	10
7. Accepting assigned work, using time to good advantage	10
8. Constantly alert to dangerous situations	5
9. Offering to do and doing extra jobs	10
10. Honest about time of leaving	10
	100

There also is a citizenship list, which likewise is checked daily.

WE have worked out a set of lesson sheets which are used in the classroom and at the nursery center. These sheets tell in very simple language what is to be done. The following topic headings will suggest what is included in these sheets:

1. Students Are Participants in the Nursery Center.
2. What Constitutes a Good Nursery Center.
3. Young Children's Needs.
4. General Instructions for Participants in the Nursery Center Program.
5. Some Things to Remember About Children.
6. Suggestions for Students Who Assist on Playground.
7. Some Things to Remember in Planning Children's Food.
8. Directions for Setting Tables.
9. Routine Procedure at Lunch Time.
10. How to Help Children Establish Desirable Eating Habits.
11. Rest.
12. Routine Procedure at Sleep Time.
13. Suggestions for Students Who Assist in Toilet Routine.
14. How to Select Books and Stories for Young Children.
15. Good Technique in Story Telling.
16. Painting Activity.
17. Music.
18. Songs Which May Be Used as Part of Play Activities.
19. Experiences with Clay.
20. Plants and Animals.
21. When Children Won't Mind.
22. Thumb Sucking.
23. Bed Wetting.
24. When Children Are Afraid.
25. When Children Are Angry.

OUR girls have been very interested in this activity and are allowed to elect it for more than one term.

Several girls care for children outside of school hours and feel that they are much more efficient after completing this course. Other girls hope to use this training in their own homes of the future. One girl, who was going into nursing training and who wanted eventually to specialize with children, felt her high school training was invaluable. Many girls feel that through the study of the various problems pertaining to growth and development of younger children they come to a better understanding of themselves and make social adjustments with others more easily.

Secondary Curriculum Study In Michigan

By T. D. RICE

IN the perplexing years of the 1930's, secondary educators in Michigan, in common with many elsewhere in the nation, became increasingly concerned regarding the effectiveness of the secondary school program. As a result of this concern, the Michigan Study of the Secondary School Curriculum was organized in 1937. It is sponsored by the State Board of Education and the Department of Public Instruction, with grants from private funds to the State Board providing financial support.[1]

Plans were laid at the initiation of the Study for four phases of its activity to cover a twelve-year period. The first phase of one year was given over to developing detailed plans, selecting participating schools, and examining developments in secondary education in the United States. The second phase of four years was one of experimentation, exploration, and evaluation of promising modifications in the secondary school program in fifty-four coöperating schools. The Study is now in the third year of its third phase. This phase, which is to extend two more years, is one of continued exploration and evaluation of promising plans and procedures and of extension of these in a large number of schools. The final period of three years is projected as one of summarization and further extension of practices throughout the state. It is understood that the emphases as defined in each phase are not mutually exclusive.

As a means of freeing the participating schools to explore modifications in curriculum programs, the colleges in Michigan agreed to admit graduates from those schools in terms of adopted admission standards, but without reference to the pattern of subject-matter units pursued. The agreement was made with the provision that the schools recommend the more able students in graduating classes from 1940 to 1950.

FOUR assumptions have been made in defining the point of view of the Study regarding the improvement of secondary education. They are (1) fundamental improvement is necessary; (2) this improvement should be carried on in terms of a broad concept of general education; (3) orientation for the improvement of secondary education is found in meeting better the needs of youth and the community; (4) clearly defined concepts of processes or ways of working at the improvement of secondary school programs must be developed.[2]

More specifically, the Study has accepted, in its work in Michigan secondary schools, motivating principles such as those quoted in the following:

Those affected by policies should participate in their formulation, execution, and evaluation. The Study should help school staffs devise ways in which to apply this principle among teachers and in their work with students.

Schools should modify the curriculum to provide learning experiences which sample all major areas of everyday living and relate to the interests, needs, and abilities of students. The Study should help schools evaluate pres-

[1] The General Education Board, McGregor Fund, and Children's Fund of Michigan have been sources of grants.

[2] These assumptions are elaborated upon in *The First Five Years of the Michigan Secondary Study*, by J. Cecil Parker, Wilmer Menge, and T. D. Rice, State Board of Education, Lansing, Michigan, 1942; pp. 9–15.

ent curricular offerings in terms of this principle and help them bring about modifications which will make the principle more effective.

Schools should provide for continuity of students with teachers for purposes of guidance and for aiding students in finding relationships between diverse educational experiences. The Study should help schools devise ways to bring about desirable continuity. Teachers also should have help in making maximum use of the continuity provided.

Schools should aid in the coördination of the citizenship educating activities of their communities. The Study should aid schools by encouraging interaction and planning between lay leaders, parents, and school representatives in joint undertakings to deal with such civic and social problems as intercultural education, citizenship practices, the war effort, and consumer economics.

Initiative for modification and improvement of the instructional program should be retained in the local school. The Study should aid administrators and teachers in clarification of their purposes and in devising procedures for effective work on their problems and for utilizing other resources in so doing.

The following paragraphs contain a brief review of some of the changes in Michigan secondary schools in which the Study has had some share and of some of the projects and activities of the Study. The forces which influence the degree and kind of changes in schools are multiple. Some of them are obscure and others direct. There is no intention to convey the implication that the Study has been the sole source of motivation in bringing about changes reported. It is, however, our belief that the foregoing principles are operative in the changes and projects cited.

During recent years, issues of the "Journal" have reported on activities of California's "coöperating" schools, which, under the sponsorship of the State Department of Education and the Association of California Secondary School Principals and with the assistance of California universities have conducted curriculum experimentation under a plan which allowed them a certain freedom in the planning of their programs to meet university requirements. Somewhat similar experiments have been tried elsewhere, one of the most important of them being the Michigan Study of the Secondary School Curriculum. The present article describes the progress made by Michigan's fifty-four "coöperating" schools and offers a basis for comparison of what has been done within California with what is going on elsewhere.

Dr. Rice, who writes the article, is director of the Michigan Study. Prior to joining the Study staff in 1941, he had been a member of the faculty at Northwestern University for two years —as instructor in the teaching of social studies, supervisor of social studies student teachers, and core teacher in the New School, which is sponsored jointly by Northwestern and by the Evanston Township High School. Earlier he had participated in Denver's Eighth-Year Study core program as a supervising teacher and as chairman of the Senior High School Social Studies Curriculum Committee.

ONE of the major projects of the Study since 1941 has been the discovery and extension of the practice of education for democratic citizenship. This aspect of the Study's program is to be reported in a subsequent article; therefore, it is not elaborated upon here. It should be pointed out, however, that the work of the Study as a whole and developments in that project are intricately interrelated.

In the second year of the Study, staffs in participating schools, in coöperation with the staff of the Study, conducted a survey of the status of their programs and the current practices at that time. These surveys provided comprehensive data as a basis for evaluation of subse-

quent changes. During the last year, eighteen of these schools conducted another survey as a means of self-evaluation, and for comparison with the surveys carried on in their schools in 1938. Since the Study has proceeded on the principle that local initiative should be retained and that those affected by policies should participate in their formulation and evaluation, the surveys were conducted by the school staffs themselves—the staff of the Study operating on a service basis to those schools undertaking the survey.

In general, reports from the eighteen schools indicate that the following changes were most common:

Increased use of current materials and problems.

Extended informalization of classroom activities.

More frequent planning of courses in terms of the interests and needs of students as recognized by themselves.

A greater degree of student and teacher cooperation in planning the school program.

More frequent use of combination, core, or unified studies classes through multiple period or block scheduling.[3]

For the most part the changes have been made in individual classrooms by individual teachers or small groups of teachers working together. It is not unusual, therefore, to find conventional teaching existing in a classroom adjacent to one in which newer procedures are being used. Perhaps the changes noted above should be called trends, for they represent change in emphasis and ways of working more than change in courses offered. In the analysis of reports, the most common characteristic which appeared was that of interaction or group planning between administrators and teachers, between teachers, and between students and teachers. This characteristic closely adheres to the assumptions made by the Study in regard to how change might be brought about in secondary programs. In the judgment of the staff, ways in which local staffs bring about changes which are identified as integral within the school determine support of the changes and provide a basis for further modification.

The development of group planning and interaction has been encouraged as a part of the program of the Study. Individual consultation by staff members with teachers, both in the participating and in other schools, has stimulated subsequent planning. Frequent conferences of such teachers on student needs, curriculum problems, and materials, which have been conducted with maximum sharing by participants in definition of the purposes and in the procedures of the conferences, also have been means of developing interaction. Other procedures have been teacher visitation of other schools; the use of teachers as consultants in other schools; the use of consultants from colleges and elsewhere who are skilled in group processes; encouragement of individual teachers or groups of teachers to work on school problems at summer workshops; school planning committees; local preschool-opening conferences; and an annual summer working conference of one week, sponsored jointly with the Michigan Secondary School Association, in which administrators and teachers from the participating schools and other schools have opportunity to exchange experiences, analyze problems, and develop plans.[4]

The activities of the Study in emphasizing the development of local procedures of working on school problems have been supported by the instructional policy underlying the curriculum pro-

[3] For additional data regarding this survey and other changes, see *Curricular Changes in Eighteen Michigan Schools, 1938-1943*, published by the Study, Lansing, Michigan (mimeographed).

[4] See *Local Pre-School Conferences*, second in a series by the Study of "Leads to Better Secondary Schools in Michigan," for a review of the experiences and procedures of school staffs in planning conferences prior to the opening of school in 1940-42.

gram of the Department of Public Instruction, which places responsibility for improvement of their programs in the hands of local schools. A further support to these activities and an outgrowth from them has been the encouragement of the organization of faculty planning committees in all schools by the State Curriculum Planning Committee this year.

ANOTHER trend noted in changes reported from schools participating in the Study is that of more frequent combinations of periods for core, unified studies, general arts, and other classes. One reason for the appearance of more of these combinations is the increased concern for identifying and doing something about the interests, needs, and abilities of youth. The second reason is realization that greater continuity in learning experience should be provided. The arrangement of schedules which permits a group of students to remain for more than one period of a school day with a teacher or a team of teachers has been a means of attaining these purposes.

There appear two general kinds of results in the schools which have undertaken to provide such combinations. One of these results has been a more effective guidance procedure. Teachers and students who work together for more than a period daily, in many cases for more than a year, have developed acquaintance which permits the teacher to deal more effectively with student problems than when they are together in single homeroom or classroom periods only. Teachers have informalized their class procedures as a result of this closer interaction with students and have seen the possibility of interpreting that which was being studied and modifying it, the better to contribute to the needs of the students. This modification accounts for the trend noted in a previous paragraph of the increased use of current materials and analysis of more current problems.

A second result of the continuity provided through combined periods has been increased interest in the activities and problems of high school graduates and drop-outs. The Study has recognized the importance of encouraging schools to develop follow-up procedures. In 1942, through a special grant, one staff member devoted several months to surveying the literature on follow-up studies and making first-hand investigations of the follow-up procedures then used in Michigan schools.[5]

The number of follow-up studies being conducted in Michigan high schools has been increasing during the last three years. There are, however, comparatively few surveys which are systematically conducted. In a recent canvass of the state, thirty-eight high school principals reported that they have a follow-up procedure. The greater number of these studies include only high school graduates attending colleges. Former students now in military service are given next most frequent attention, while former students now in industry and agriculture are followed up to a lesser degree.

The continuity provided through core and unified studies programs has resulted in certain changes in the curriculum as well as in guidance. As was indicated in a foregoing paragraph, there is greater readiness on the part of teachers to modify their courses by beginning with problems which they know students to have, by extending pupil-teacher planning, and by using more diversified materials. Thus, conscious effort is being made to contribute to guidance through the curriculum.

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[5] The results of this study are published in the "Leads to Better Secondary Schools in Michigan" series, *Follow-up of Secondary School Students*, the Study, Lansing, Michigan.

The combination courses have resulted in greater emphasis on general education in junior high school and tenth and eleventh grades. Another result of continuity has been a modification in concepts of evaluation. Teachers engaged in these programs have become interested in and are utilizing evaluation procedures which are continuous and which involve students and teachers in coöperative relationships. There is, also, an increased degree of the use of self-evaluation techniques.

IN 1941 the Study undertook a controlled experiment in the teaching of geometry in which nine experimental and nine controlled classes in fourteen schools were involved. The purposes of this study were:

> To discover, describe, and compare the attainment of the two groups in developing and using their ability to think critically and logically in dealing with typical everyday problems, and in solving conventional plane geometry problems.
>
> To discover and describe what happens to a plan of instruction which has been developed by one teacher when it is taken over and applied by another.
>
> To discover and describe what influences on the teacher become apparent from the adoption of an instructional idea developed by another.[6]

The contrasting procedures studied were conventional geometry teaching and the nature-of-proof approach as defined in the thirteenth Yearbook of the National Council of Teachers of Mathematics.

So far as students in the two groups are concerned, the findings indicate in general that:

> The experimental group made slightly greater gains than the control group in their performance on two thinking tests. The differences in gains, however, were not statistically significant.
>
> The control group attained a higher level of achievement in dealing with strictly geometry content than did the experimental group.
>
> Students in the experimental group achieved distinctly greater gains than students in the control groups in their ability to verbalize adequate concepts of critical thinking and proof.[7]

Another finding in this study is that mathematics teachers in typical high school programs can use the nature of proof approach satisfactorily. It was observed that the teachers who undertook the nature-of-proof approach in an experimental class and who also taught a conventional geometry class modified their procedures in the direction of the nature-of-proof approach in the latter classes.

ONE of the on-going activities of the Study has been that of working with and encouraging the use of consultants from the colleges and other agencies in the state. During the past semester one institution made available a member of its staff for full-time consultant work in the field through the Study. In three other institutions, liaison arrangements have been made with the Study whereby joint activities are planned between the institutions, the Study, and schools in their districts of the state. This arrangement is resulting in somewhat more frequent calls on college staffs for consultant service in the field. Another result is that persons serving schools from the college staffs are becoming more familiar with the immediate problems confronting schools and are aiding their own institutions in analyzing how best they can contribute to the needs of the schools and to the preparation of teachers.

As a means of aiding teachers in schools which are seeking to use more extensive materials, the Study has had several materials conferences in coöperation with the State Library. In these conferences, which are held in the vari-

[6] Parker, Menge, and Rice, *op. cit.*; p. 63.

[7] *Ibid.*, p. 72.

ous regions of the state, teachers from schools participating in the Study and other schools in the same district meet, exchange experiences, examine a wide display of current materials in areas known to be of concern to the teachers in those schools, and discover ways and means whereby such materials may be better utilized.

DURING the past two years the impact of the war has made itself felt in every school in Michigan. In those schools in which there were the double period programs, it was noted that this form of organization provided a ready means whereby the school could organize itself to contribute to the various drives for scrap, paper, war bonds, stamps, and so forth. Other schools without these programs in many cases made an equally effective record; however, the mechanics for student participation in the drives seemed to be more readily achieved in programs in which continuity was provided.

During the past year it has been noted that schools have tended to reorganize within science and mathematics courses rather than to offer new courses for induction training. In many instances the preinduction courses have been retained as separate offerings, but, in the main, the impact of this trend has resulted in careful analysis of what is taught in science and mathematics with reorganization within those courses as a consequence.

One of the most serious results of the war has been high teacher turnover. In many schools in which the program had been based upon continuity of teacher personnel and long-term planning, this turnover has led administrators to curtail the development of their programs. The techniques of teacher education in service for those teachers who remain in the schools are under severe test at this time, for administrators, in the midst of their efforts to maintain and extend the programs they have been developing, are confronted with the necessity of orienting teachers new to their systems. Such procedures as those referred to in these paragraphs with regard to consultant services, teacher conferences, and visitation are all the more essential at this time.

THE phases through which it was planned that the Study proceed were predicated on continuing and evolving programs within the schools. Many schools are continuing to plan and carry out for gradual modifications. It is necessary, however, in many other schools for the Study to intensify its efforts to aid the schools in in-service training rather than to proceed on the assumption that experimental studies can be continued. Perhaps one of the major contributions in this period is to discover how continuity and development of school programs can be carried on in the face of high teacher turnover, to aid schools in absorbing and adjusting to the demands of the war period, and to work closely with them in laying plans for the difficult adjustments confronting them in the postwar years.

Nazis Set Up Diploma Mill in Norway

Nazi occupation authorities in Norway are offering "short cut" diplomas to Norwegian high school or university students who volunteer for service with the German armed forces, the Nazi-controlled Jeloey radio has disclosed in a broadcast reported by the Federal Communications Commission. The broadcast announced that puppet Premier Vidkun Quisling had signed a decree giving such volunteers an opportunity to take "special examinations which will have the same value as ordinary graduation."

What's Happening in California Secondary Schools

Edited by FRANK B. LINDSAY

Aviation Education in the Secondary Schools of California.—Aviation education is a comparatively recent development in secondary schools, and some principals have expressed uncertainty as to what the nature of the work should be and how much emphasis it should receive in their schools. Early in 1944 a questionnaire was sent to representative schools throughout California to gather information in regard to the nature of offerings, curricular adjustments which have been made, the type of students taking the work, the preparation of teachers in charge of the work, and opinions as to what should be the nature of the work in future years. Many of the results do not lend themselves to rigid statistical treatment, but as general information may be taken as representative. A brief summary of the information obtained was presented at the Conference on Aviation Education held at the University of California, May 18-20, 1944.

Replies were received from 100 high schools. Returns came from 27 schools with less than 20 teachers, from 27 schools with 20 to 40 teachers, and from 46 schools with more than 40 teachers. It was assumed that schools in the first group would not have more than one full-time science and one full-time mathematics teacher and that such limitations would make it necessary for them to make special adjustments to introduce work in aeronautics, that the schools with 20 to 40 teachers could arrange easily to have at least one special course, and that the schools with more than 40 teachers might develop a sequence of two or more courses in this field.

According to the returns, 10 of the 100 schools which replied are not giving any special emphasis to aviation. Of these 10 schools 6 are small, 2 medium, and 2 large.

In 15 schools—6 small, 5 medium, and 4 large—no special courses in aeronautics are being offered, but in these schools the aeronautics work is being done as integrated parts of other courses.

Separate courses in aeronautics are offered in 75 of the schools replying. Of these, 15 are small, 20 medium, and 40 large.

Of the 75 schools offering special courses, 62 are offering courses characterized as preflight, general aviation, or aviation science. Several of the larger schools have broken down the field and are offering separate courses in meteorology, aerodynamics, navigation, power plants, radio, and various shop courses.

In only a few cases have the schools attempted to organize their courses into a sequence of difficulty. Most of the courses are placed on the junior or senior level and may be taken in any order. Eight schools, however, have divided their work into elementary and advanced courses. Comments indicated emphasis is being given in the other courses even when a specific course is

being offered in aeronautics. The most common type of combination is the extra block or unit in science of aviation.

There is little agreement on prerequisites for aeronautics courses. Algebra, algebra-geometry, algebra-geometry-physics, and junior standing are most common among the prerequisites given. Several schools did not reply to this item, and 10 schools indicated no prequisites at all.

As to the type of students taking the courses in aviation, "average" received the majority of checks, with "superior" a close second. Several schools checked "superior," "average," and "below average," a fact which indicates that all types of students are taking the courses.

Only 6 schools—1 small, 1 medium, and 4 large—are substituting aeronautics courses for regular science courses. Comments on this item class most aeronautics courses as electives. In some cases, schedules have been changed to enable students to take required science courses and the aeronautics courses also.

Only 4 schools indicated that regular science teachers are not favorable to aeronautics courses; however, the comments on other returns indicated that more of them are not particularly sympathetic toward such courses.

Slightly over half of the schools reacted to the item in regard to in-service education needs of teachers of aeronautics courses. In most of the schools answering, the teachers of these courses already have had special preparation. In some cases a need for more practical experience, for more laboratory techniques, and for more recent information was indicated.

In reply to the question as to whether aeronautics courses are to be permanent in the school program, 54 schools—10 small, 15 medium, and 29 large—answered in the affirmative, while 8 schools—3 small, 3 medium, and 2 large—gave a negative reply and 23 schools—7 small, 7 medium, and 9 large—gave conditional answers such as "depends upon needs or upon demands." The other 15 schools did not react to this item.

The replies from 66 schools—13 small, 19 medium, and 34 large—indicated that the courses in aeronautics have been successful and of value, while replies from 5 schools—2 small, 1 medium, and 2 large—were to the effect that the work has been of no particular value. In three of these cases, the lack of success was attributed to the loss of aeronautics teachers. The remainder of the schools did not react to this item.

A separate course designated as "preflight," providing laboratory and actual practice, was favored by most of those who reacted to the item in regard to the most effective course in aeronautics.

The majority of schools reacting to the item on curricular placement and arrangement of aeronautics courses favored making them electives in the junior and senior years.

Summary—As 87 per cent of the small, 93 per cent of the medium, and 96 per cent of the large schools reporting are doing work in aeronautics either in specific courses or in connection with other courses, and since 59 per cent of the small, 74 per cent of the medium, and 87 per cent of the large schools reporting are giving specific courses in aeronautics, and since many of the large schools and only a few of the small ones are offering more than one course in aeronautics, evidently the larger schools are giving more attention than are the smaller ones to aviation education. The comments also indicated that more and better prepared teachers for aeronautics courses are available in the larger schools than in the smaller ones.

Since no sequence of courses including aeronautics has been developed,

since the matter of prerequisites is very indefinite, and since all types of students take these courses, it would seem as if the work in aviation on the secondary level is still an uncertain quantity.

Comments by the principals indicated several problems with which they are confronted. For example, under the present set-up college preparatory students are in effect forced to take the regular science courses and will not have time for a technical course in aviation. This leaves the poorer students for such courses, which arrangement is not satisfactory and is very discouraging to the teacher of aeronautics courses.

The relationship of aeronautics work to the established high school courses is very disturbing. In spite of the fact that the inclusion of aeronautics has motivated the work in science, many principals are not willing to modify their regular science courses and requirements to permit the introduction of aeronautics work.

The conflicting reports from military authorities as to the value of the work being done by the high schools in the field of aviation is very disconcerting. Although the principals say that they can see the value of such courses, they need authoritative backing to convince parents that their children have chosen wisely when they take courses in aeronautics instead of standard science courses.

It seems, however, that some kind of course or group of courses will be likely to find a place in the secondary school curriculum, as 54 per cent of the schools replying are planning to give this work a permanent place in the curriculum, and 23 per cent of the schools will continue to provide the work if needed or demanded. As further support of this prediction, 66 per cent of the schools stated that courses in aeronautics have not only provided new fields of exploration for the students, but that they also have promoted greater interest and mastery in regular science and mathematics courses.

Apparently the principals are considering the following types of work in aviation on the high school level: (*a*) general informational courses to acquaint all high school students, regardless of ability, with the commercial and social importance of aviation; (*b*) special shop courses for those students who are inclined and are by nature fitted for construction and maintenance work: (*c*) highly technical courses for those students who plan to be pilots; and (*d*) modification of regular high school courses to give proper emphasis to the new subject matter in aviation.

Recommendations.—On the basis of the information provided in these questionnaires and the comments made by the principals the following recommendations are made:

Experiments and studies should be made with general informational, shop, and highly technical courses, and with course combinations, to determine where, how, and to what extent aviation education should be introduced into the high school curriculum.

Some existing state committee should study the situation and formulate a set of policies in regard to credits and admission status of courses in aeronautics.

Care should be exercised to avoid overemphasis of aviation and the inclusion of materials which do not logically belong on the high school level.—Loaz W. Johnson, *coördinator of secondary education, Butte County Schools.*

* * *

The Berkeley Curriculum Workers' Conference.—Curriculum workers from twenty counties attended a conference at Berkeley, June 13 and 14, under the joint sponsorship of the School of Education, University of California, and the Division of Secondary Education,

State Department of Education. The superintendents of schools of Alameda, Contra Costa, Inyo, San Diego, and Shasta Counties came with members of their staffs.

Inyo County was particularly well represented, as Superintendent Dorothy C. Cragen brought also Miss Mavis Slater, director of visual education in the Inyo County office, R. D. Meairs, principal of Big Pine High School, and Miss Ruth Frankel, counselor at Bishop Union High School, Superintendent Lucy Hunt of Shasta County was accompanied by two members of her County Board of Education—President Genevieve Anders of Fall River Joint Union High School at McArthur and Miss Margaret Hardenbrook of Redding, in addition to Miss Margaret M. Burnham and Miss Anne Hospers of the Shasta County Schools curriculum staff.

Modoc County was represented by General Supervisor Earl Murray and Superintendent L. J. Austin and Marks Smith of Modoc Union High School. General Supervisor Lawrence W. Reinecke came for Siskiyou County. From the other extreme of California, Superintendent John S. Carroll of San Diego County brought his two curriculum coordinators, Francis L. Drag and Clarence Fielstra. Assistant Superintendent M. E. Mushlitz presented the program of curriculum coördination for Ventura County.

The problems of city school systems in curriculum coördination were submitted by Deputy Superintendents Reese E. Burt of Modesto and Albert D. Graves of San Francisco and Assistant Superintendents George C. Jensen of Sacramento and Robert H. Reinhard of Santa Ana.

Butte County Curriculum Coördinator Loaz W. Johnson reported a survey of aviation education in California high schools. Contra Costa County Superintendent B. O. Wilson and two members of his staff, Director of Supervision Harold W. Karr and Supervisor of Child Welfare Robert J. Meade, discussed articulation between elementary and high schools through transfer of pupil record data among schools. Curriculum Coördinator Ethel S. Ward and Grace Knoles of Washington Union reported the Alameda County adaptation of the State Curriculum Commission's statement of educational principles for County Superintendent Vaughn D. Seidel.

A group discussion of the core curriculum was directed by San Mateo County Coördinator Elsie Toles. Problems of county curriculum activities were presented by Coördinators Fred C. Beyer, Stanislaus County; Eva C. Dalander and Birdie M. Esser, San Joaquin County; Reuben R. Palm, Los Angeles County; O. S. Hubbard, Santa Clara County; T. E. Dunshee and L. P. Linn, Fresno County; E. V. O'Rourke, Yolo County; and Harry Wandling, Merced County.

Dean Frank H. Freeman of the School of Education, University of California, Berkeley, opened the conference with a presentation of educational issues in curriculum making, and Modesto City Superintendent Aubrey A. Douglass summarized the findings of the conference.

* * *

The California High School Cadet Corps.—Analysis of reports from eighty high schools on the annual inspection of California high school cadet units for 1944 filed with the state superintendent of public instruction by the administrative officer, California High School Cadets, Lieutenant Colonel William Rutherford, for the adjutant general, Brigadier General Ray W. Hays, shows cadet companies were maintained in high schools whose total enrollment ranged from 170 pupils in

two instances to 3,200 and 4,000 at the other extreme.

Nine of the high schools with cadet companies have enrollments of not to exceed 250 pupils; thirteen have enrollments around 300 to 400 pupils; twelve are schools with enrollments of 500 to 600; fifteen have enrollments of 700 to 800; fourteen are high schools, 900 to 1,200 pupils in size; ten range in size from 1,500 to 1,800 pupils; and seven exceed 2,000 pupils in enrollment.

The program appeals to boys in both rural and urban high schools. Among city systems with cadet units are Berkeley and San Jose in the Bay district; Bakersfield, Chico, and Fresno in the Central Valleys; Alhambra, Burbank, El Monte, Monrovia, and Redondo in the vicinity of Los Angeles; and Ontario and San Bernardino farther removed from the metropolitan areas. High schools in which cadet units were operated during 1943-44 were distributed through thirty-four counties as follows: for the North Coast and Bay Region, twenty-one schools in nine counties; for the Sacramento Valley, twenty schools in eleven counties; for the San Joaquin Valley, fifteen schools in six counties; and for Southern California, twenty-four schools in eight counties.

Comments by high school principals at the close of the school year 1943-44 give an interesting cross-section of varying opinions concerning the value of having a cadet company in their schools. Principal Earle P. Crandall of Lodi Union writes: "We have seen a splendid change of attitude on the part of cadets from the standpoint of courtesy and military bearing." On the other hand, Principal Glenn J. Guthrie of Eureka City states: "I cannot see that it has had any effect whatever on discipline throughout the school and cannot tell that it has had any effect on the classwork of the boys who are in the Corps." Principal James C. Nisbet of Oroville Union observes: "The High School Cadet Corps in this school has provided an opportunity for the development of leadership among the boys, especially those who do not find their places in other activities. It has been especially gratifying to see how many were able to benefit by their training when called into the armed services." Principal Aileen S. Hammond of Redondo Union notes: "The program has helped the school to discover leaders and has fostered a spirit of patriotism among our students. The group has participated in many community programs and has conducted a flag-raising ceremony daily."

District Superintendent M. J. Harkness of Victor Valley Union comments: "The Cadet Corps already has assumed an important place in school life and in the lives of the boys. It is my belief that the Cadet Corps will become a great force for character training in our studentbody and will prepare our boys better to serve their country. Already we have had parents commend the Corps for the effect it has had on their boys." Principal Harvey H. Ferris of Weed adds: "I feel that the California High School Cadet program is one of the finest things that we have ever placed in our schools. It has given our boys splendid training in leadership, responsibility, character, poise, and personality as well as training in military techniques." Principal Carl H. Schrader of Fort Bragg Senior concludes: "Discipline problems, while not great before, have practically vanished from our school. Our boys would be the first to object, I am sure, to the discontinuance of this training."

Principal Paul M. Goodwin of Mount Shasta sees a fourfold value in the program of the California High School Cadet Corps: "First, the individual boy learns many important principles, such

as neatness, cleanliness, courtesy, discipline, which are all qualities he will carry into later life. Second, the school program for the boys and girls takes on new meaning with a unit of Cadets as a part of it. Respect for our flag, country, and our fighting men is greatly developed. Third, the community profits by having a unit such as this. Coöperation between this group, the American Legion, and other organizations, brings out good citizenship. Fourth, it develops for the state and nation a corps of men with a better understanding of what it means to be an American."

* * *

Driver Education Institutes.—Ninety-nine persons enrolled at Berkeley and 108 in Los Angeles for the teacher-training Institutes of Driver Education sponsored by the Departments of Education and Motor Vericles and held at the University of California, July 17 to 21, and the University of Southern California, July 31 to August 4. Instructors at both Institutes were Milton D. Kramer, administrative assistant, Center for Safety Education, and consultant on Driver Selection and Training to the Quartermaster General; Harold R. Hanford, director, Education Division, National Conservation Bureau; and Amos E. Neyhart, Institute of Public Safety, Pennsylvania State College, and consultant on Road Training, American Automobile Association.

One hundred twenty-one high schools distributed among thirty-nine counties were represented by teachers and administrators. Los Angeles City Schools had thirty instructors in attendance, and there were fourteen present from nine other high school districts in Los Angeles County. Fresno and Mendocino Counties each had six high schools represented; Monterey, Riverside, and Tulare Counties each had teachers from five high schools; and Contra Costa, Sacramento, Solano, and Yolo Counties each had four schools represented at the Institutes. Solano County had nine principals and teachers at the Berkeley Institute.

Alexander Hamilton High School, Los Angeles, had the largest faculty group of any single school in attendance; four teachers received certificates for completion of the course: the Misses Dorothy T. Phillips, Myrtle M. Starr, and Katherine Tawney and Camillo V. Guericio. Representatives from the staffs of seven county superintendents of schools attended: Los Angeles, Mendocino, Santa Clara, Stanislaus, Tulare, Ventura, and Yolo. Five city school systems had staff members at one or the other of the Institutes: Alhambra, Fresno, Long Beach, Sacramento, and Vallejo.

* * *

Coördinating High School and College Teaching of Foreign Language.—In proposing to set up norms of achievement for a two-year high school course in French, German, and Spanish, educators are seeking to bridge a certain gap now separating the language departments in high school and college. Too often the high school graduate on entering college finds himself deficient in preparation for college language work and faces needless discouragement. The solution of the problem seems to lie in an analysis of the first-year course in college, leading to a statement of objectives for that course. If the high school teacher knows these objectives he can shape his courses to meet them, and then high school graduate and college sophomore can work side by side in the second-year course with comparable preparation.

Committees of language teachers are now at work on this problem.—BAYARD Q. MORGAN, *associate editor; chairman, Department of Germanic Languages, Stanford University.*

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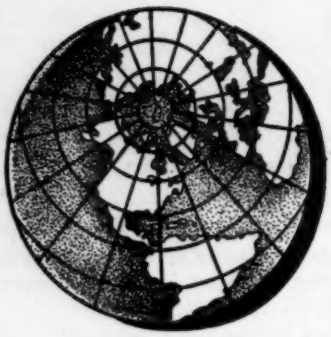

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